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Adolescent positive mental health: policy, measurements, prevalence and correlates in a Chinese setting

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Stockholm 2018

Cover illustration by Professor Jizhi Guo, according to the Chinese philosopher Confucius, ‘Pleasure and anger, sorrow and joy: before they emerge they are called centered; emerging by the proper rhythms they are called harmony. Reaching centered harmony, heaven and earth take their proper places and the things of the world are nurtured. (喜怒哀乐之未发, 谓之中; 发而皆中节, 谓之和。致中和, 天地位焉, 万物育焉。)’
Translation source: http://www.camcc.org/_media/english-reading-group/zhongyong-yiren.pdf

Published by Karolinska Institutet.
Printed by E-Print AB.

ISBN 978-91-7831-148-4

Adolescent positive mental health: policies, measurements, prevalence and correlates in a Chinese setting
THESIS SUBMITTED FOR DOCTORAL DEGREE (Ph.D.)

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To my grandma (from my mother's side),

who passed away in 2002.

When I was a child, she said,

'you will study abroad,

and get a PhD.'

Abstract

Introduction Adolescence is a period of one's life that harbors many risks, but it also presents us with a number of fantastic opportunities for sustained health and wellbeing, through education and preventive efforts, for example. Mental health issues in adolescents have attracted the attention of the public and of academia. This is the case because mental health problems affect 10% – 20% of children and adolescents worldwide, accounting for a large portion of the global burden of disease which may develop into psychiatric disorders in later life. Positive mental health, as a syndrome of symptoms including positive feelings and life functioning, is an essential part of understanding mental health in general. The promotion of mental health and the identification of adolescents who are at risk (in terms of mental health problems) by using appropriate instruments is essential to the reduction of mental illness worldwide. Thus far, there has been no previous study of positive mental health in adolescents in China. This thesis explores and examines the policy context, measurement, prevalence, and a number of relevant correlates of positive mental health in Chinese adolescents from the city of Weifang.

Method In Study I, a policy translation with respect to adolescent mental health was analyzed using the Policy Triangle Framework. Data was collected by means of interviews with local policy actors and via an analysis of a number of official documents at the national, provincial, and local levels. Study II and Study III include a quantitative survey study, using a comprehensive questionnaire including Mental Health Continuum-Short Form (MHC-SF) and other scales and items and was distributed in the urban area of Weifang, Shandong Province in 2014. Approximately 5,400 students from Grade 8 and Grade 10 responded to the questionnaire. In Study II, the reliability and validity of the MHC-SF was tested by (i) calculating Cronbach's alpha coefficient, (ii) performing a confirmatory factor analysis and (iii) by comparing the strength of the correlation between a number of different measurements of positive mental health and mental illness. In Study III, the prevalence of positive mental health was presented in terms of proportions of categories of interest. Multivariate logistic regressions were employed in calculating odds ratios (OR), and 95% confidence intervals (CI) were used in analyzing a number of variables associated with 'flourishing mental health' (as the dependent variable). In an additional analysis, a two-continua model of positive mental health and mental disorders was tested by using exploratory factor analysis and confirmatory factor analysis.

Results Chinese national policies are implemented via a top-down process; the Ministries of Health and Education instruct provincial- and local levels, in some detail, on how they should provide education about mental health to school students (Study I). MHC-SF showed excellent internal reliability (Cronbach's α=0.92), structural validity and external validity (Study II). In the sampled Chinese adolescents, 57.4% of the participants were diagnosed as 'mentally healthy' or 'flourishing' (Study III). 'Gender', 'perceived family economy', 'the occurrence of sibling(s)', 'satisfaction of self-appearance', 'physical activity', 'sleep quality', 'stress', 'social trust', 'desire to learn', 'support from teachers and parents', as well as 'not being bullied at school' were significant indicators of positive mental health (OR ranging from 1.23 to 2.75) (Study III). Mental disorders and mental wellbeing were confirmed to be related, but also distinct factors (see additional analysis).

Conclusion This is the first time that the positive mental health of adolescents has been assessed in Chinses adolescents. This thesis presents an analysis of a number of different aspects relevant to the positive mental health of adolescents in Weifang, China. In particular, the prevalence of and associated indicators of positive mental health in the sampled adolescents were investigated. The main findings in this study are in agreement with many previous studies in this area.

Preface

In the early 2000s, people in China began to notice a series of problems among adolescent members of society. These problems included being obsessed with video games, feeling inferior, entering into conflicts with their teachers, rebelling against seemingly insurmountable study-related stress, and an increase in the number of young people who had committed suicide. Since this time, academia, policy makers, and the public have continued to reflect over and discover some of the reasons behind these problems and a number of solutions for the problem of deteriorating mental health in adolescents have been proposed.

In 2013, I became aware of the Survey of Adolescent Life in Västmanland (SALVe) in the name of 'Liv och Hälsa' (Life and Health). This survey consisted of a recurrent study that included a number of comprehensive questionnaires that were distributed to school students once every two years. The plan for the 2014 survey was to prioritize mental health; especially positive mental health, and its correlates in different age groups. After reading the Swedish version of the questionnaire (with the aid of Google Translate), I concluded that this questionnaire might also be a powerful tool that could be used to assess the positive mental health of adolescents in China. Despite the cultural differences between a Northern European country and China, I found that the questionnaire actually covered most aspects of my own teenage life. It may be the case that adolescents around the world live lives that are very similar to each other? I had no idea. However, looking back on my own teenage life made me feel that the mental health of adolescents should be assessed more thoroughly and serious effort should be made to find relevant correlates with adolescent mental health, so that we can properly understand this area and provide intervention, if necessary. The Chinese context was a good starting point, because I am familiar with it. I thus decided to choose to examine the mental health of a sample of Chinese adolescents as my PhD research topic, in partial acknowledgement of my own teenage life.

'Courage, my friends; 'tis not too late to build a better world.'

- Tommy Douglas

LIST OF SCIENTIFIC PAPERS

I. **Guo C**, Tomson G, Söderqvist F, Keller C. Promotion by education: adolescent mental health policy translation in a local context in China. (Submitted)

II. **Guo C**, Tomson G, Guo JZ, Li XY, Keller C, Söderqvist F. Psychometric evaluation of the Mental Health Continuum-Short Form (MHC-SF) in Chinese adolescents: a methodological study. *Health and Quality of Life Outcomes*, 2015. 13: 198.

III. **Guo C**, Tomson G, Keller C, Söderqvist F. Prevalence and correlates of positive mental health in Chinese adolescents. *BMC Public Health*, 2018. 18(1): 263.

Contents

List of abbreviations

BMI	Body Mass Index
CFA	Confirmatory factor analysis
CFI	Comparative Fit Index
CI	Confidence interval
EFA	Exploratory factor analysis
EWB	Emotional wellbeing
GDP	Gross domestic product
HADS	Hospital Anxiety and Depression Scale
MHC-SF	Mental Health Continuum-Short Form
MMQL	Minneapolis-Manchester Quality of Life Scale
NRCMS	New Rural Cooperative Medical Scheme
OR	Odds Ratio
PWB	Psychological wellbeing
RMSEA	Root Mean Square Error of Approximation
SALVe	Survey of Adolescent Life in Västmanland
SRMR	Standardized Root Mean Square Residual
SWB	Social wellbeing
UEBMI	Urban Employees Basic Medical Insurance
URBMI	Urban Resident Basic Medical Insurance

Definitions

Adolescence	a phase of life (10–19 years) that is readily influenced by social, environmental and cultural factors [1]
Content analysis	a widely used qualitative research technique that is used to interpret meaning from the content of text data [149]
External validity	the extent to which the results of a study can be generalized to other situations and to other people [164]
Health policy	a way for societies to organize themselves in achieving collective health goals [75]
Health system	all organizations, people, and actions whose primary interest is to promote, restore, or maintain health [77]
Mental health	a state of wellbeing in which an individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to their community [8]
Odds Ratio	a way to quantify how strongly the presence or absence of property A is associated with the presence or absence of property B in a given population [193]
Policy actor	those who have specific responsibility for developing formal policies inside and outside of the public health sector, including individuals who influence how policies are translated into practice, such as middle managers, health workers, patients, and citizens [75]
Policy content	the substance of a policy which details its consistent parts [144]
Policy context	systemic factors, including political, economic, and social factors (either national and international) which may influence health policy [144]
Policy process	the way in which policies are initiated, developed or formulated, negotiated, communicated, implemented and evaluated [144]
Prevalence	the proportion of a particular population that suffers from a disease [193]
Reliability	the extent to which a measurement gives results that are consistent [193]

1 Introduction

Adolescence refers to the traditional age-bound definition of a phase of life (10–19 years) that is readily influenced by social, environmental, and cultural factors [1]. Adolescence is a period of one's life that harbors many risks, but it also presents us with many opportunities for sustained health and wellbeing, through education and preventive efforts, for example. Mental health disorders affect 10% – 20% of children and adolescents worldwide and account for a substantial portion of the global burden of disease [2]. Despite being one of the leading causes of the global disease burden, mental illness remains underestimated in disease burden calculations [3]. At the beginning of the current millennium, the mental disorders ranked first over all other diseases in China and accounted for approximately 20% of the total disease burden in this population [4]. There is mounting evidence that many, if not most, lifetime psychiatric disorders first appear in childhood or adolescence [5]. Since a substantial proportion of the mental health problems suffered by adults originate early in life, mental health problems are often long-lasting [6], and may even lead to suicide [7]. Therefore, the promotion of mental health and the early identification of adolescent individuals whose mental health is at risk is essential to reduce the significant disease burden that mental health poses worldwide. Achieving this goal is dependent on the deployment of appropriate instruments.

This thesis explores and examines the policy context, measurement, prevalence, and a number of relevant correlates of positive mental health in Chinese adolescents from the city of Weifang. The introductory chapter presents definitions of *mental health* and *mental disorders* and proceeds by providing a description of the concept of 'positive mental health'. Further to this, relevant policy and health systems in relation to adolescent mental health and the Chinese research setting are presented.

1.1 Mental health and mental disorders

1.1.1 Definition

Mental health is defined in a positive sense as 'a state of wellbeing in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to contribute to their community' [8]. Thus, mental health is more than just the absence of mental disorders or disabilities. Given this, the promotion, protection, and restoration of mental health can be regarded as a vital concern for individuals, communities, and societies throughout the world [8]. At present, (i) the hedonic

tradition that deals with positive emotions and (ii) the eudaimonic tradition that places focus on the optimal functioning of an individual in everyday life dominate the field with respect to the identification of the components of positive metal health [9]. Considering the hedonic and the eudaimonic approaches simultaneously, *positive mental health* can be defined as 'the presence of general emotional, psychological, and social wellbeing' [10]. It has been long assumed that wellbeing would prevail if pathology is absent. However, a growing body of evidence has shown that high levels of wellbeing are good for both individuals and society, and is associated with a range of positive outcomes [11].

Mental disorder, also called *mental illness*, is a clinically significant behavioral or psychological syndrome or pattern that occurs in an individual. Such a disorder is associated with present distress, disability, or with a significantly increased risk of the individual suffering death, pain, disability, or a significant loss of freedom [12]. Mental disorder is commonly associated with harm to others or self-harm. Research on mental disorders, including the identification, diagnosis, treatment, prevalence, and indicators of mental disorders is abundant [13].

Mental wellbeing, however, has not been provided with a global definition [14]. What *mental wellbeing* may refer to differs across various groups and cultures. Generally speaking, mental wellbeing is demonstrated by a set of cognitive, emotional, and behavioral responses and can be said to relate to happiness and an individual's positive functioning in life.

1.1.2 Adolescent mental health

The prevalence of mental disorders in adolescents is difficult to summarize worldwide due to the different age categories that have been used in previous studies [15]. Previous studies have shown that the prevalence of mental disorders in this part of the population may range from 8% (in the Netherlands) to 57% (for adolescents receiving healthcare services in the United States). The estimated global average lies between 10% – 30% [15-28]. In summary, at least one out of every four to five young person in the general population will suffer from at least one mental disorder in any given year [15]. Collishaw et al. also found a substantial increase in adolescent behavioral problems during their 25-year study that affected both genders, all social classes, and all family types [29].

1.2 Positive mental health

1.2.1 Definitions

In the positive sense of the term, *mental health* builds on the hedonic tradition and the eudaimonic tradition of 'wellbeing' [9, 30, 31]. The hedonic tradition, dating from the ancient Greek, focuses on happiness and defines *wellbeing* as 'pleasure attainment and the avoidance of negatives'; both determined by feelings and emotions [9]. The limitation of this theory can be seen in how it neglects to take into account the value and meaning aspect of wellbeing. The eudaimonic tradition, which can be traced back to the original work of Aristotle, proposes that the goal of human functioning is to live in a manner that is consistent with one's 'true self' or 'best potentials' [9, 31]. These two traditions are the origins of current theories about positive mental health.

Although many researchers have explored the concept of 'positive mental health' by employing a number of different theories, thus far, there remains no global definition of *positive mental health* [32, 33]. Keyes has suggested *mental health* be operationalized as 'a syndrome of symptoms of positive feelings and positive functioning in life' [10]. The Public Health Agency of Canada has referred to *positive mental health* as:

> […] the capacity of each and all of us to feel, think, and act in ways that enhance our ability to enjoy life and deal with the challenges we face. It is a positive sense of emotional and spiritual wellbeing that respects the importance of culture, equity, social justice, interconnections and personal dignity [34].

Definitions of *positive mental health* are, and should be, to some degree context-dependent [35]. Vaingankar et al. define *positive mental health* in an Asian context as 'the ability to build and maintain relationships, possess coping skills, pursue personal growth and autonomy, and participate in religious and spiritual practices' [36]. In the present thesis, Keyes' definition of *positive mental health* is employed, as it has been successfully adapted in several countries including China.

1.2.2 Predictors and frameworks

A number of different predictors of positive mental health in general populations have been identified across different countries. Researchers have found several predictors of positive mental health; including 'socio-demographics' [10, 37-44], 'health status' [41, 42], 'physical activity' [43, 45-47], 'body image' [48], 'sleeping' [49], 'screen time' [47, 50], 'substance

use' [43, 51, 52], 'social support' [38, 40, 43, 44] and the prevalence of 'violence' or 'discrimination' [40]. With respect to positive mental health in adolescents, school-related factors such as 'peer relationships' and 'support from teachers' play an important role [51]. In the Chinese context, 'socio-economic factors' were found to be significant predictors of positive mental health in Chinese adults [53]. Another study has shown that 'physical activity' is a significant predictor of positive mental health in Chinese college students [46]. Other researchers have found that 'perceived discrimination' is negatively associated with psychological wellbeing among Chinese migrant adolescents [54].

Conceptual frameworks for positive mental health and its determinants have thus been developed in a number of countries. Twenty-five determinant indicators of positive mental health in children, young people, and adults in Canada have been defined at the individual, family, community, and societal levels [34]. The Canadian study lists individual predictors such as 'physical activity', 'substance use', 'a nurturing childhood environment', 'resilience', 'control and self-efficacy', 'spirituality', 'violence', and 'coping'. Family indicators are 'household composition', 'family relationships', 'parenting style', 'family physical and mental health status', 'substance use among family members', and 'family income'. Community predictors include 'social support', 'social network', 'school environment', 'workplace environment', 'community involvement', 'neighborhood social environment', and 'neighborhood-built environment'. Finally, the predictors at the societal level include 'inequality', 'discrimination', as well as 'political participation'. According to Maher and Waters [55], predictors of positive mental health at the individual level for children generally refer to 'the presence of social connections' and 'a strong sense of self and self-worth', and may also include measurements of 'a sense of belonging', 'self-esteem', 'engagement', 'self-determination and control', as well as 'quality of life'. Family indicators consist of 'parental mental health', 'freedom from violence', 'family cohesion', 'parent-child attachment' and 'the use of responsive, developmentally appropriate family and parenting practices'. Parkinson has categorized predictors of positive mental as individual, community, and structural constructs [56]. The individual construct encompasses 'learning and development', 'healthy living', 'general health', 'spirituality', and 'emotional intelligence'. The community construct is composed of 'participation', 'social networks', 'social support', 'trust', and 'safety'. Finally, the structural construct is made up of 'equality', 'social inclusion', 'discrimination', 'financial security/debt', 'the physical environment', 'working life', and 'violence'.

1.2.3 Keyes' model of positive mental health

Keyes' model of positive mental health has been developed for over a decade and has been tested in several American, African, Asian and European countries (see Table 1). It is currently the most developed model for assessing positive mental health. The theoretical foundation of Keyes' model consists of various aspects of hedonic and eudaimonic well-being including happiness as well as human potential. Based on this theory, the concept of 'flourishing' is defined as the combination of these two aspects of wellbeing as they promote 'a good life' [57]. Mental health is thus presented as a state where individuals can be said to flourish as well as the absence of mental illness [58]. Accordingly, Keyes has developed an instrument to assess the three dimensions of wellbeing and to categorically diagnose whether a person is subject to a flourishing, moderate or languishing mental health [10]; namely, the Mental Health Continuum.

The short form of the Mental Health Continuum (MHC-SF) is adapted from the long form (MHC-LF) [59]. The latter consists of 40 items that measure 'wellbeing'. Six items measuring 'emotional wellbeing' in the MHC-LF were developed partly from Bradburn's 'affect balance scale' [60], while one item was converted from Cantril's 'self-anchoring items' [61]. This instrument yields three levels of positive mental health: 'flourishing', 'moderate' and 'languishing mental health'. 'Flourishing' refers to a state where people have high levels of wellbeing in life, meaning that they often experience positive emotions and function well, from both psychological and social perspectives. On the other hand, 'languishing' is equivalent to stagnation and emptiness; a feeling that life lacks interest and engagement [10]. People who are neither 'flourishing' nor 'languishing' have 'moderate mental health'.

So far, the MHC-SF has been psychometrically tested in a number of different countries, including South Africa, Poland, Italy, South Korea, and Brazil [62-69]. The scale has also shown good psychometric properties on a sample of Chinese adults from six provinces/municipalities [53]. Joshanloo and colleagues found support for the factor structure ('emotional', 'psychological', and 'social') and full metric invariance of the MHC-SF across three countries; the Netherlands, South Africa, and Iran. Thus, the strength of the relationships between the MHC-SF items and latent factors were found to be equivalent across these three populations [70]. Moreover, a Polish study has confirmed the factor structure and full configural invariance to the MHC-SF by 'gender' and by 'educational attainment' [64]. It is notable that recent studies have shown that the bifactor model is a better model than the oblique three-factor model; thereby indicating that 'mental wellbeing' is best

conceptualized as an overarching latent construct ('general wellbeing') [69, 71, 72]. Consequently, it advised that researchers should not calculate separate scores for three types of wellbeing when using the MHC-SF. Table 1 shows the percentages of flourishing individuals in different countries from previous studies. The lowest level of 'flourishing mental health' was found in South Korean adolescents (11.7%), while the highest level was identified in Canadian adolescents and adults (76.9%).

Table 1. The prevalence of 'positive mental health', as assessed by MHC-SF in a number of previous studies.

Author(s), year	Target group	Sample size	Prevalence ('positive mental health')	Country
Lim, 2014[65]	Adolescents	547	11.7%	South Korea
Karas et al., 2014[64]	Aged above 16	2,115	26.0%	Poland
Petrillo et al., 2014[66]	Adults	1,438	30.9%	Italy
Salama-Younes, 2011[73]	Adults	339	23.48%	Egypt
Keyes et al., 2008[62]	Adults	1,050	20%	South African
Keyes, 2005[57]	Adults	3,032	18%	United States
Dyrbye et al., 2012[74]	College students	4,400	53.1%	United States
Gilmour, 2014[42]	Adolescents and adults	25,113	76.9%	Canada
Yin et al., 2013[53]	Adults	2,021	43.4%	China
Singh et al., 2015[68]	Adolescents	539	46.4%	India

1.2.4 Does positive mental health (or mental wellbeing) equate to the absence of mental illness?

Keyes has proposed a two-continua model that is based on the hypothesis that positive mental health is correlated to, but distinct from, mental illness [57]. Commonly, individuals who suffer from mental problems are more likely to have a low level of mental wellbeing, for example, as manifest in decreased 'life functioning'. However, this does not mean that an individual who experiences mental symptoms cannot simultaneously enjoy a high level of positive mental health. In a US population including adolescents and adults, Keyes has argued that mental health and mental illness are not opposite ends of a single continuum in

adolescents [51, 57]. Consequently, the absence of mental illness does not necessarily equate to the presence of mental health. Lamers et al. also verified this claim in a Dutch sample, by comparing factors from the MHC-SF, that represents positive mental health, and the Brief Symptom Inventory, that represents mental illnesses [63]. Karas et al. repeated the same procedure in a Polish study using the MHC-SF and the General Health Questionnaire, with respect to 28 items [64]. Exploratory and confirmatory factor analyses were performed in all these studies in order to assess the correlation and distinction between positive mental health and mental illnesses.

1.3 Policy and healthcare systems in relation to adolescent mental health

1.3.1 Mental health policy and systems

Health policy is a mean by which societies can organize themselves so as to achieve collective health goals [75]. A policy identifies the objectives, the roles of different sectors, organizational arrangements, the agenda for capacity-building and organizational development, and provides guidance for prioritizing expenditure; thus linking the analysis of any existing problems to the decision-making process associated with resource allocation [76]. Policy actors at the national level can be defined as those individuals who have specific responsibility for developing formal policies inside and outside of the public health sector and those individuals who influence how policies are translated into practice, including middle managers, health workers, patients, and citizens [75]. According to the World Health Organization (WHO):

> […]mental health policy, programs and legislation are necessary steps for significant and sustained action. These policies should be based on current knowledge and human rights considerations. [76]

Health systems are central to the provision of evidence-based mental healthcare [77]. The key components for mental healthcare system development are (i) the provision of treatment for mental disorders in primary care, (ii) accessibility to essential psychotropic medication, (iii) the provision of care in the community, (iv) public education initiatives, (v) community involvement, including families, and consumers, and (vi) the establishment of national research initiatives. Accordingly, a mental healthcare system involves all organisations and available resources that are focused on improving mental health and achieving policy and legislative goals. This includes the work done by community mental health services, mental health in primary healthcare, human resources, public education, links with other sectors, and

monitoring and research [78]. Healthcare systems can also be analysed in terms of concepts such as the healthcare system's 'vision', 'organization', 'resources', 'intersectional partnerships' and 'participation'. Such analysis is performed in order to find aspects in the healthcare systems that influence the adoption and implementation of preventative and promotional activities [79].

Most high-income countries have been engaged in the development of mental healthcare systems and mental healthcare policies over long periods of time. However, children and adolescents with mental health problems have traditionally been the recipients of particularly poor service cover, especially in low- and middle-income countries [80]. Moreover, the lack of specific mental healthcare policies across the globe for children and adolescents is remarkable [81]. Notwithstanding this, even when such mental healthcare policies and programs are in place in low and middle-income countries, they often suffer from limited financial resources and inadequate manpower [78, 82]. A European survey study of 15 high-, 8 upper middle-, 8 lower middle-, and 5 low-income countries revealed that there is a high degree of heterogeneity with respect to access to trained staff in child and adolescent mental healthcare [83]. Drawing on previous research, the income level of a country is of particular significance with respect to successful adolescent mental healthcare policy development and implementation [78, 80-88].

1.3.2 The school context

Many school-based programs offer the promise of improved access to diagnosis and treatment of mental health problems in children and adolescents [85]. Schools are significant providers of mental healthcare services for children and adolescents [86-88]. The role of school mental healthcare professionals is described in the following way in a study conducted in an American context:

> […]the delivery of mental health promotion, prevention programs aimed at resolving psychosocial problems, enhancing resiliency in students and early interventions, building the capacity of school staff toward mental health and systemic change in school programs, as well as supporting schools with empirically supported treatments for students that may have one or more diagnosable mental disorder. [86].

Accordingly, healthcare policies often expect teachers to take on the responsibilities of front-line mental health professionals; in cases such as the early identification of children's mental

health problems and referrals to adequate professional support [89]. In summary, school is a significant policy actor with respect to children and adolescents.

1.4 China: the research context

1.4.1 Demographic characteristics

By the year 2016, China had a population of 1,382 million, of which 57.4% lived in urban areas [90]. Of the population as a whole, 17.7% were below 16 years old, 65.5% were between 16 years and 60 years old, and 16.7% were above the age of 60 [90]. The urbanization process in China is still ongoing and is characterized by a yearly increase in the percentage of the population who reside in urban areas. There was an increase of 1.25% in this percentage in 2016 compared to the previous year [90]. Figure 1 presents the population pyramid of China, 2017.

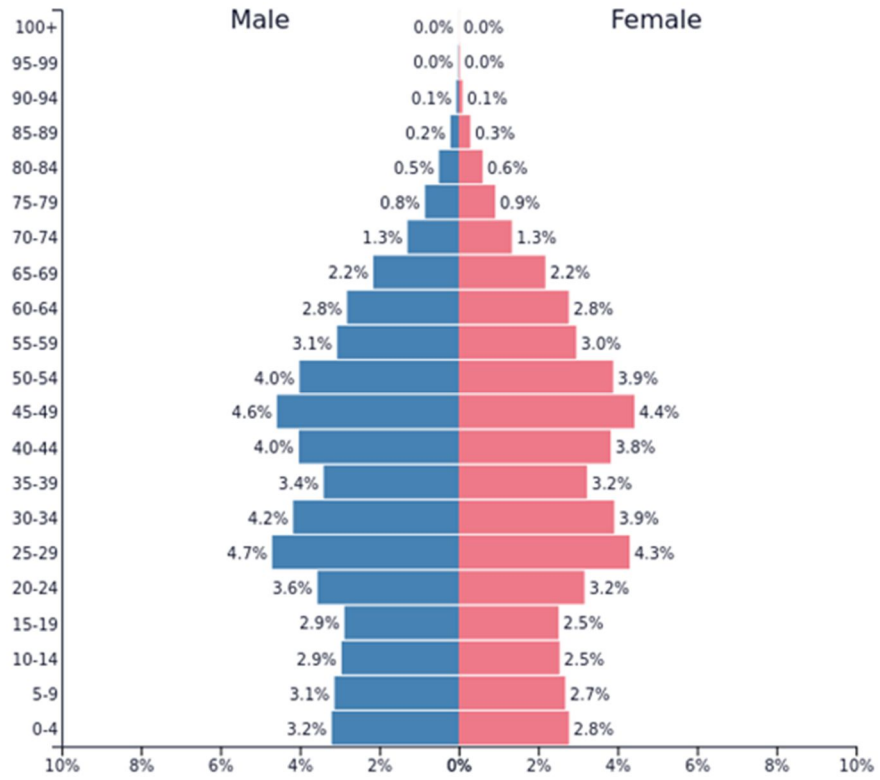

Figure 1. The population pyramid of China, 2017. (Source: populationpyramid.net)

1.4.2 The Chinese economy

Recent statistics show that China has the second largest economy by nominal GDP in the world [91]. The economic growth rate has averaged 10% per year over the past 30 years [92], making it the fastest growing major economy globally. Known as the largest manufacturer in

the world [93], China is also the largest exporter of goods [94]. At the same time, China is the world's second largest importer of goods, accounting for 10% of total global imports [94]. Alongside this economic growth, however, air, water and soil pollution have become huge socio-economic challenges and pose a number of serious health threats to the population of China [95]. By the end of the year 2016, the employed labor force in China included 776 million people. More than half of this labor force consisted of urban residents. The unemployment rate in urban areas was just 4.02% [90]. During the social and economic transition that has taken place over the last 30 years, young people generally have adapted to these rapid changes with an attitude of hope for better opportunities [96, 97]. It is notable that the long-term rural/urban divide in China has caused serious levels of income inequality and has created gaps in many aspects of individual life, including gaps in the provision of healthcare, housing, and pension benefits [98].

1.4.3 The healthcare system in China

A series of healthcare reforms and local experiments in China since the 1990s have resulted in the current healthcare system [99]. The launch of the Urban Employees Basic Medical Insurance (UEBMI) in 1998 obliged all urban workers and their employers to contribute 2% and 6% (of wages due) respectively to the insurance fund [100]. Followed by the launch of New Rural Cooperative Medical Insurance Scheme (NRCMS) for the rural population in 2003, and the Urban Residents Basic Medical Insurance (URBMI) for the urban population which was not covered by UEBMI in 2007, the healthcare insurance system in China was significantly strengthened [100]. The Ministry of Health (currently called the National Health and Family Planning Commission) is the ultimate administrators for healthcare provision and price management, while other ministries, for example, the Ministry of Finance, are involved in healthcare funding [101, 102]. By the year 2016, there were 29,000 hospitals in China, of which 13,000 were public institutions. At this time, a total of 3.17 million physicians and assistant physicians and 3.5 million nurses were registered in China [90]. The organizational structure of the health system in China is presented in Figure 2.

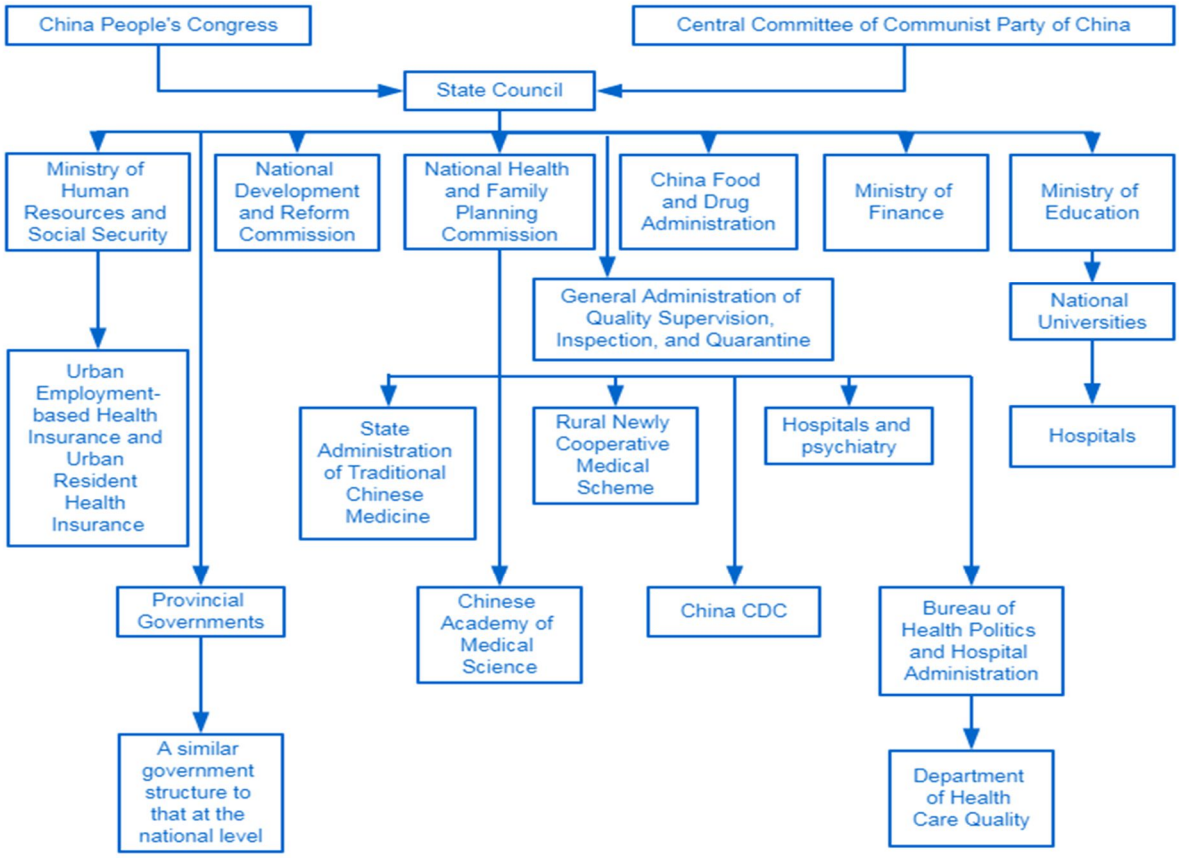

Figure 2. An overview of the organizational structure of the healthcare system in China. (Source: Hai Fang, Peking University 2015).

China's current mental healthcare policy was formulated in 1987 and its first national mental healthcare law was passed in 2012 [103, 104]. The policy document of 1987 includes a description of a number of obstacles that faced the provision of mental healthcare and provided advice for future plans in this area. However, a mental healthcare system has been gradually established since the People's Republic of China was founded in 1949, and especially since market-based reforms were enacted 30 years ago [105]. Recently issued policy documents include the National Mental Health Project of China: 2002–2010, the Proposal on Further Strengthening Mental Health Work, and Guidelines for The Development of the National Mental Healthcare System (2008–2015) [4, 106, 107]. Further to these somewhat general policy documents, several specific policy documents have been released to promote adolescent mental health in the school context. These documents include Guidelines for Mental Health Education in School, Guidelines for Mental Health in Primary and Secondary Schools, and supplementary information [108, 109]. It is noteworthy that the work associated with the promotion of mental healthcare for adolescents is performed by the education administration in China. The central government defines the aims and goals in this area and provides implementation strategies in its policy documents.

More than 20,000 psychiatrists [110] or psychiatric nurses, assisted by a smaller number of clinical psychologists and social workers, constitute the vast majority of mental healthcare professionals in China. Psychiatrists and licensed psychiatric nurses are accredited by the Ministry of Health, psychological counselors by the Ministry of Human Resources and Social Security, and psychotherapists by both Ministries [111]. Mental health advisors embody main workforce with regards to the promotion of mental health for adolescents, especially in the school context. A section of these advisors were originally teachers, who were licensed as advisors after receiving training and passing their accreditation examinations. Other mental healthcare advisors were recruited as graduates in psychiatrics or psychology. All mental health advisors are appointed by the Ministry of Education.

1.4.4 The education system in China

China has the largest education system in the whole world [112]. The organization of the system is presented in Figure 3. In 2014, there were about 260 million students and more than 15 million teachers in 514,000 schools [113]. The school system in China comprises of the following general levels: pre-school, primary school (Grade 1-6), lower secondary school (Grade 7-9), senior secondary school (Grade 10-12), and the university level. According to the compulsory education law of the People's Republic of China, (a law that was passed in 1986 and amended in 2006), students must attend primary school and lower secondary school education for nine years [114]. After finishing their compulsory education, students have the right to choose whether they wish to attend the senior secondary education level. Admission into a senior secondary school depends on the prospective student's score in a public examination. In 2014, 95% of adolescents who completed the compulsory education level continued on to study at the senior secondary school level [113]. In 2016, lower secondary schools and senior secondary schools admitted 14.8 million and 8.0 million students respectively [90]. The Ministry of Education of the People's Republic of China is the official central governmental agency which administers and regulates the provision of education across the whole country. A decentralization of educational management has taken place at the national level, down to the provincial and school levels. For example, with respect to curriculum management, the Ministry of Education develops plans, regulations, and guidelines for curriculum. At the provincial level, a curriculum implementation plan is produced based on national documents and the local, provincial context. At the school level, school headmasters have the authority to develop their own courses, in accordance with the

structures provided by the provincial plans [112].

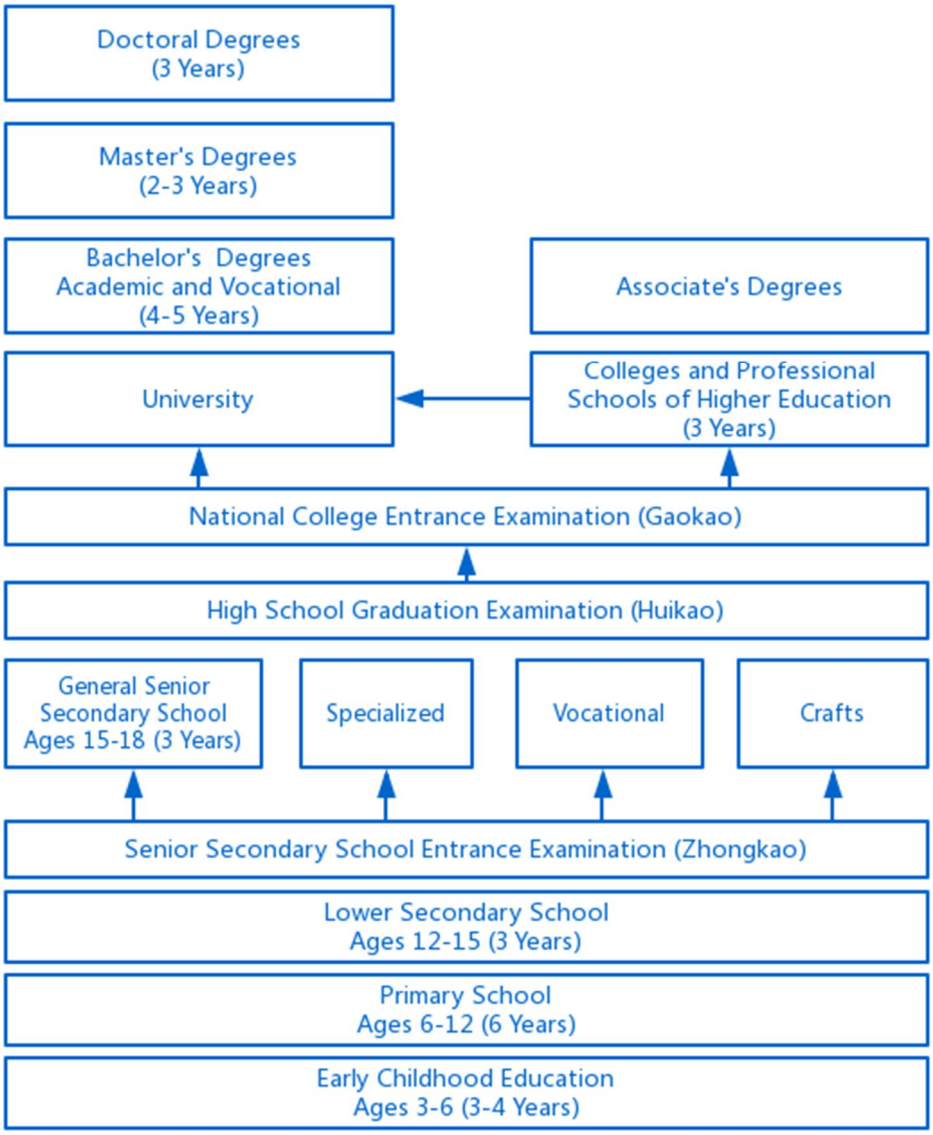

Figure 3. The education system in China.

1.4.5 Adolescent mental health in the Chinese context

1.4.5.1 The mental health status of Chinese adolescents

Previous research has shown that the prevalence of adolescent mental health disorders in China is similar to that as shown by the global trend of declining mental health. A recent review of the situation has suggested that the mental health of Chinese middle school students has been slowly decreasing over time since 1992 [115]. However, the prevalence of mental disorders shows wide differentiation from a geographical perspective, and, in some areas of China, researchers found moderate or good mental health in the adolescent population [115]. Another review has shown that the average prevalence of depression in college students,

(individuals who can be said to be at the end of adolescence), was 30.39% [116]. Similarly, Hesketh and Ding found that one third of the adolescents who were included in their study reported a history of depression [117]. A meta-analysis of the relevant literature, including approximately 300 original studies, has found that the mental health of Chinese adolescents has progressively decreased since the early 1990s [118]. Wu et al. reported that one fourth of the adolescents who were included in their study stated that they were in need of the services of a mental health professional [119]. Houri et al. compared the mental health of adolescents in the three countries, Japan, South Korea, and China [120]. The results of this study showed that Chinese students reported more instances of depression than the Korean and Japanese students, but they also reported on experiencing fewer difficulties with respect to interpersonal relationships, fewer somatic symptoms, and a higher degree of happiness. Zgambo et al. reported that 16% of the Chinese schoolchildren who were included in their study had clinically significant depressive symptoms [121].

1.4.5.2 The predictors of adolescent mental disorder in China

A range of risk factors and protective factors for mental disorder in children and adolescents is presented in Figure 4 [15]. Only two biological risk factors, ‘substance abuse’ and ‘physical health’, were taken into consideration in the present study. However, these two factors may well account for a proportion of mental disorders and reveal differential rates and distribution in terms of gender.

	Risk factors	Protective factors
Biological		
	Exposure to toxins (eg, tobacco, alcohol) in pregnancy Genetic tendency to psychiatric disorder Head trauma Hypoxia at birth and other birth complications HIV infection Malnutrition Substance abuse Other illnesses	Age-appropriate physical development Good physical health Good intellectual functioning
Psychological		
	Learning disorders Maladaptive personality traits Sexual, physical, emotional abuse and neglect Difficult temperament	Ability to learn from experiences Good self-esteem High level of problem-solving ability Social skills
Social		
Family	Inconsistent care-giving Family conflict Poor family discipline Poor family management Death of a family member	Family attachment Opportunities for positive involvement in family Rewards for involvement in family
School	Academic failure Failure of schools to provide appropriate environment to support attendance and learning Inadequate or inappropriate provision of education Bullying	Opportunities for involvement in school life Positive reinforcement from academic achievement Identity with school or need for educational attainment
Community	Transitions (eg, urbanisation) Community disorganisation Discrimination and marginalisation Exposure to violence	Connectedness to community Opportunities for leisure Positive cultural experiences Positive role models Rewards for community involvement Connection with community organisations

Figure 4. Risk factors and protective factors for mental disorder in children and adolescents, by domain [15].

Most of the risk factors of mental disorders listed in Figure 4 have been proven to be relevant to investigations into mental health in China. Wang et al. suggested that 'physical inactivity' and 'overweight/obesity' are negatively associated with positive mental health in Chinese adolescents [122]. The combined effects of 'physical inactivity' and 'obesity' have been shown to increase the risk of anxiety and depression in adolescents. Cao et al. found that 'high screen time' was a risk factor with respect to depressive symptoms, anxiety symptoms, and school life dissatisfaction; whereas 'sufficient vigorous physical activity' was a protective factor for depressive symptoms and school life dissatisfaction. The combination of 'high screen time' and 'insufficient vigorous physical activity' was associated with the

highest prevalence of various psychological problems [123]. Hong et al. added to the growing amount of evidence that 'physical activity' is inversely associated with depression [124].

The results of a Hong Kong study indicate that 'self-esteem' in adolescents is correlated to, and a predictor of their physical and mental health [125]. Zheng et al. suggest that 'low self-esteem' played a significant role in the etiology and the course of depressive symptoms that develop in response to exposure to daily hassles [126]. Furthermore, Li et al. conclude that student 'ethnicity', 'gender', 'level of satisfaction with one's major in college', and 'age' are predictive of a students' mental health status [127].

Negative life events including 'academic stress', 'criticism from others', 'family conflicts', 'peer bullying', 'discrimination', and 'interpersonal conflicts' have been associated with perceived stress in secondary school students [128]. 'Exposure to natural disasters', like earthquakes, has also been identified as a risk factor for mental disorders among Chinese adolescents [129].

A strong association has been found between 'bullying others' as well as 'being bullied' and suicidal ideas, suicidal attempts, and self-harm behaviors in schoolchildren [130, 131]. Hong et al. observe an independent association of 'bullying' with 'increased risk of suicidal ideas' among adolescent students. Note that this association is affected by 'depression' [132]. A significant association between 'a stressful psychosocial school environment' and 'suicidal ideas' has also been found in Chinese adolescents [133].

It has been observed that the association between 'the occurrence of negative events' and 'increased depressive symptoms' is moderated by social support from peers in adolescents suffering from sub-threshold depression [134]. By comparing migrants from rural to urban areas with local adolescents, researchers have claimed that 'family cohesion' is inversely associated with 'depressive symptoms' and 'low self-esteem' among all adolescents [135]. 'Gender', 'age', and 'socioeconomic factors' are also shown to affect adolescents' self-rated physical and mental health. Guo et al. found a strong relationship between 'family socioeconomic status' and 'depressive symptoms' in a sample of Chinese adolescents [136]. 'Family environment' was shown to be a significant factor with respect to the mental health of Chinese adolescents [137]. Children and adolescents with siblings and children and adolescents without siblings reported significantly different levels of mental health [138, 139].

2 Aim

2.1 Overarching aim

The overarching aim of this thesis is to increase the current knowledge regarding policies, measurement tools, the prevalence, and correlates of positive mental health among Chinese adolescents in Weifang, China. Figure 5 presents an overview of the studies that are included in this thesis and a summary remark on their contribution to the main theme that is explored in this thesis; namely, the positive mental health of Chinese adolescents.

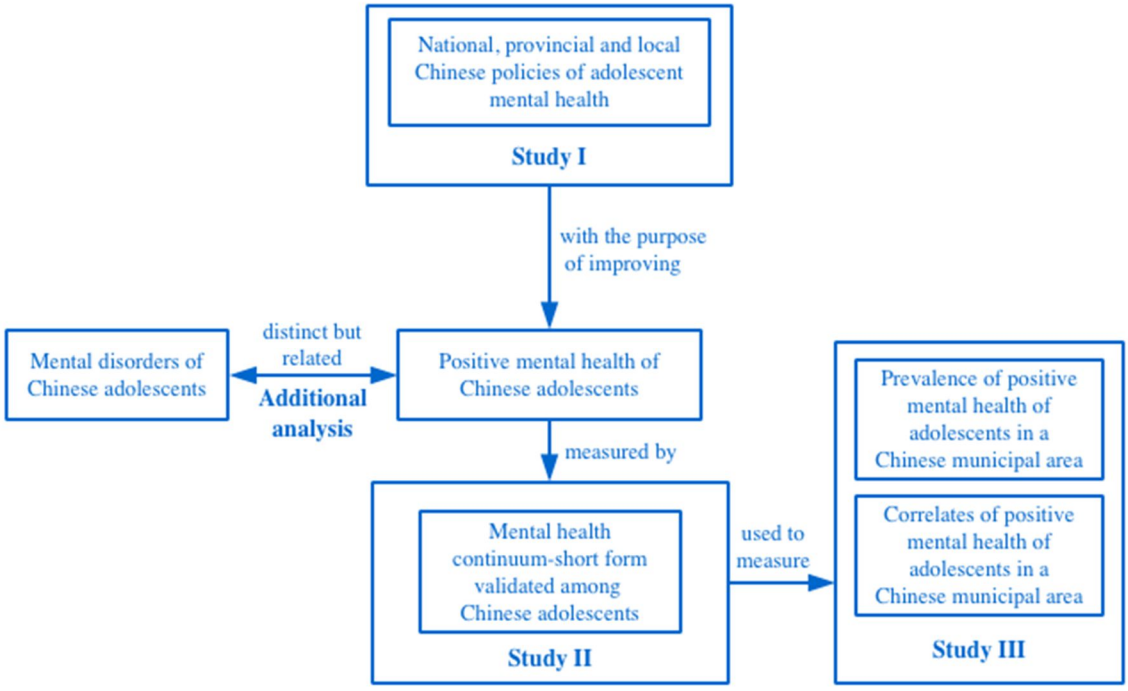

Figure 5. Thesis overview.

2.2 Research questions

In order to address the aim of this thesis, the following research questions were posed in the individual studies that are included in this thesis.

- How are Chinese national adolescent mental health policies that focus on the promotion of positive mental health translated into local plans and practice? (Study I)
- How valid and reliable is the MHC-SF as an instrument that is used to assess positive mental health in Chinese adolescents? (Study II)
- Does positive mental health (or mental wellbeing) equate to the absence of mental illness in a Chinese setting? (Additional analysis)
- What is the prevalence of positive mental health in Chinese adolescents? (Study III)

- What factors influence the prevalance of positive mental health in Chinese adolescents? (Study III)

All of the above research questions were studied and responded to in the context of Weifang, China.

3 Materials and methods

3.1 Qualitative policy study (Study I)

3.1.1 Study setting

The Chinese research context in this thesis was the city of Weifang in the central Shandong Province of the People's Republic of China. In 2016, the population of Weifang was 9.35 million. Weifang is an industrial city with a major port. Various heavy and light industries are located in and around the city. The city is also famous for its huge production of vegetables, which are supplied to major cities like Beijing, and even exported to several countries. Weifang offers its residents a high standard of living, compared to the rest of China, ranking 33rd (in terms of GDP) of approximately 300 Chinese cities in 2017 [140].

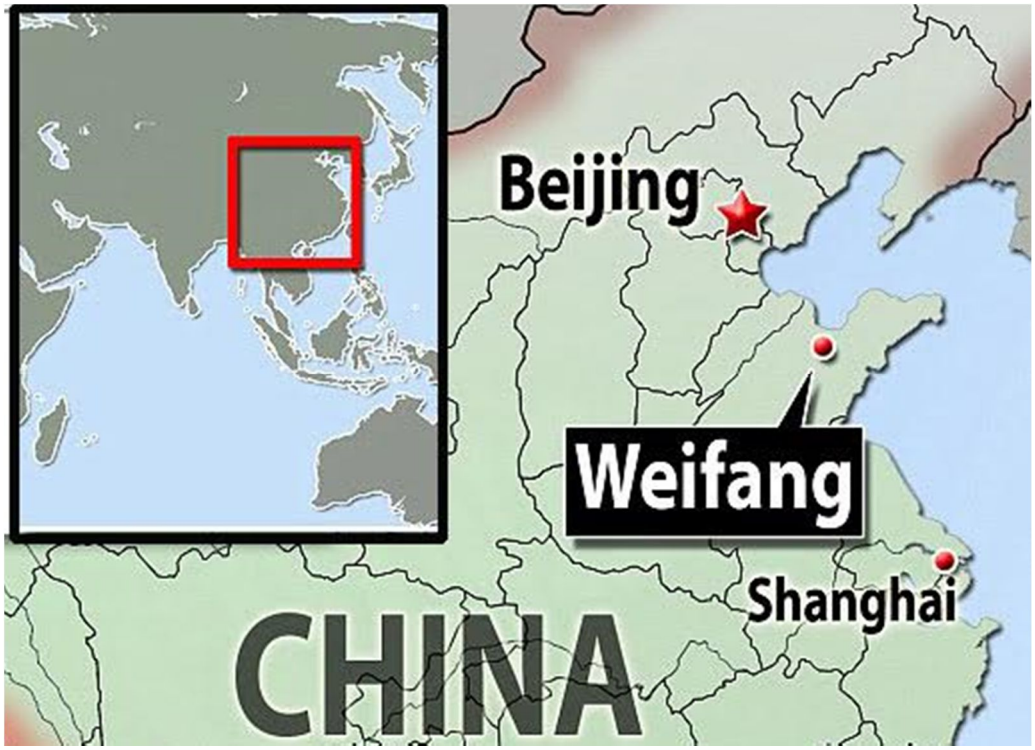

Figure 6. The city of Weifang, China. **Source: DailyMail.co.uk**

3.1.2 Research approach

A case study approach [141] was used by employing qualitative semi-structured interviews and document analysis [142] as methods of empirical data collection. The case of Weifang serves as an illustration of how adolescent mental health policy and programs for adolescents are translated in China.

The empirical data was examined and analysed by Policy Triangle Framework [143], which focuses on the *context, content, process,* and *actors* associated with mental health policies, as shown in Figure 7. *Context* refers to systemic factors, political, economic, and social, (both at the national and international levels), which may have an effect on health policy. *Content* is defined as 'the substance of a particular policy which details its constituent parts'. The *process* is the way by which policies are initiated, developed or formulated, negotiated, communicated, implemented, and evaluated. Policy actors include individuals, groups, and organisations (governmental and non-governmental) who affect policies [144]. The policy triangle framework has been used for policy analysis in various countries, as well as in different research areas, including mental health and health sector reform [145].

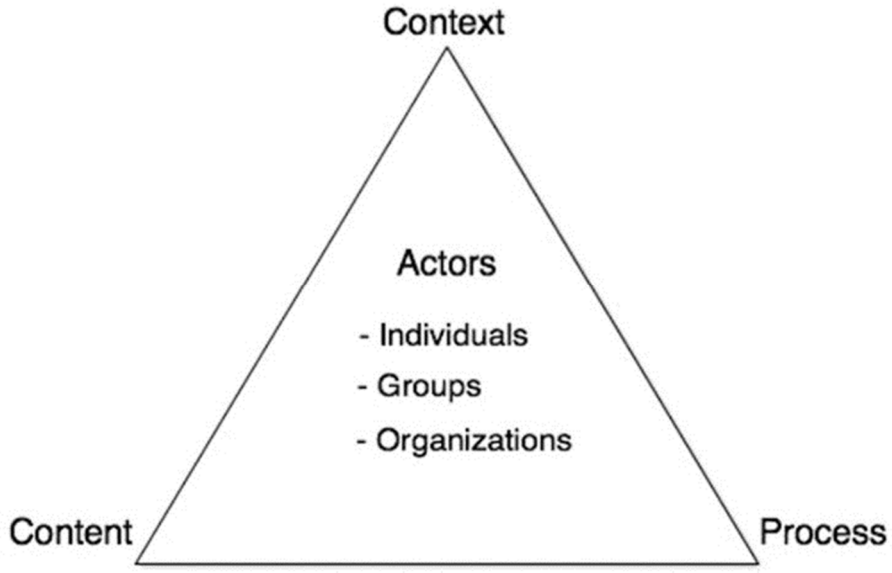

Figure 7. Policy triangle framework by Walt and Gilson [143].

3.1.3 Materials and data collection

The official documents concerning the promotion of mental health and preventing mental ill-health in adolescents were obtained from various government bodies in China at the national, provincial, and local levels. The documents were published between 2005 and 2015[146]. A search for policy documents on the web pages of ministries and governments in China was performed so as to supplement the initial document collection. Documents that were published outside official administrations were not taken into account. Documents in Chinese were translated into English by the PhD student and checked by the main supervisor.

Between April and June, 2014, semi-structured qualitative interviews [147] were conducted with policy actors who (at the time) worked at the official administration of the city and had responsibility for developing and implementing policies. Interviews were also conducted with

a number of professionals who were responsible for first-hand contact, counselling, and care of adolescents, including mental health advisors. The interviewees were chosen by employing purposive sampling [148] among local and regional policy-makers and policy-actors in adolescent mental health, in order to gain access to individuals who one might assume possessed in-depth knowledge of the mental health issues at hand. Three interviewees participated in the study. The limited number of interviewees was due to restricted access. However, the key actors involved in the adolescent mental health system, including a department head of the educational administration, a coordinator of adolescent mental health promotion, and a school mental health advisor, were included in the study and were also able to provide information on policy-making and policy actors at other levels in the system. The interviews were performed by the author in China at the interviewees' workplace. The main supervisor observed the interviews, which lasted approximately one hour each. All of the interviews were audio-recorded and transcribed into Chinese. The interviews that were conducted in Chinese were translated into English by the author and these transcripts were then checked by the main supervisor. All of the interviewees were accompanied by their hierarchical superiors, since this was a prerequisite for granting permission to conduct the interviews. The interviewees and the specific aims of the different interviews are specified in Table 2.

Table 2. Interviews with policy actors in China.

Interviewee(s) from Weifang, China	
School context	Mental health advisor (a teacher who had received special training for mental health education and now works with promoting the mental health of students): The role of the mental health advisor in the school context.
Local Administration	Department head and coordinator of adolescent mental health promotion, Weifang Education Administration: Policy development and governance of adolescent mental health.

3.1.4 Data analysis

Based on the policy triangle framework, directed content analysis [149] was used to analyse the sampled policy documents and interview transcripts. First, a coding scheme was developed in which the constructs of the policy triangle framework (*context*, *content*, *process* and *actors*) were used as coding categories. Second, the coding of the content of the policy

documents and the interviews was performed. Subsequently, a narrative description based on the constructs was developed by the author.

3.1.5 Trustworthiness

The criteria of the trustworthiness of case study research include *confirmability*, *dependability*, *credibility*, and *transferability* [141]. *Confirmability* refers to the researcher's concern for objectivity; thus findings are supposed to be the results of the experiences and ideas of the informants, instead of the researcher's [150]. To ensure the confirmability of the present study, data was collected from multiple sources of official documents and key informants. *Credibility* reflects internal validity, which is sought after in order to ensure that the researcher actually measures that which the researcher purports to measure [150]. To ensure this, a validity check was performed between the members of the research group. Member check with part of the interview participants was performed by sending transcripts to them and receiving feedback. The attainment of reliability in the study demands that the research work can be repeated by others, whilst still achieving the same results. The *dependability* of the study was consolidated through the development of a complete set of data that others could review. The data that was collected from the respondents and from the official documents were compared with each other in terms of the same issues and themes for better credibility. The policy triangle framework [143] was selected in the analysis as the main theory, upon which the notion of *transferability* could be constructed. Consequently, the results of the present study are expected to be applicable to similar situations [141].

3.2 Quantitative survey study (Study II, Study III and an additional analysis)

3.2.1 Survey design and sample

As mentioned previously, the study was performed in the urban area of Weifang city, China. Figure 8 shows the schools included in the present study from Weifang. Grade 8 in 12 middle schools and Grade 10 in 5 high schools in two urban districts of the city were included in the study using a sampling scheme involving stratification by district and school type, followed by clustering by school. Two out of four middle schools in one urban district and three out of eight middle schools in another urban district were randomly selected to be included in the study. All of the Grade 8 students in these chosen schools were sampled. Two out of three public high schools were sampled at random, regardless of their location. All Grade 10 students in these two high schools were chosen as respondents. No private high school was included because such schools only recruited students who already finished high school and

were preparing for the university admission examination for the second time. In four of the schools, students were asked to fill in the questionnaire in a given one-hour period and return the paper forms immediately. In the other three schools, the questionnaires were completed at home and brought back to the teachers the following day. Students who were absent from school when the questionnaires were distributed were not included in the study.

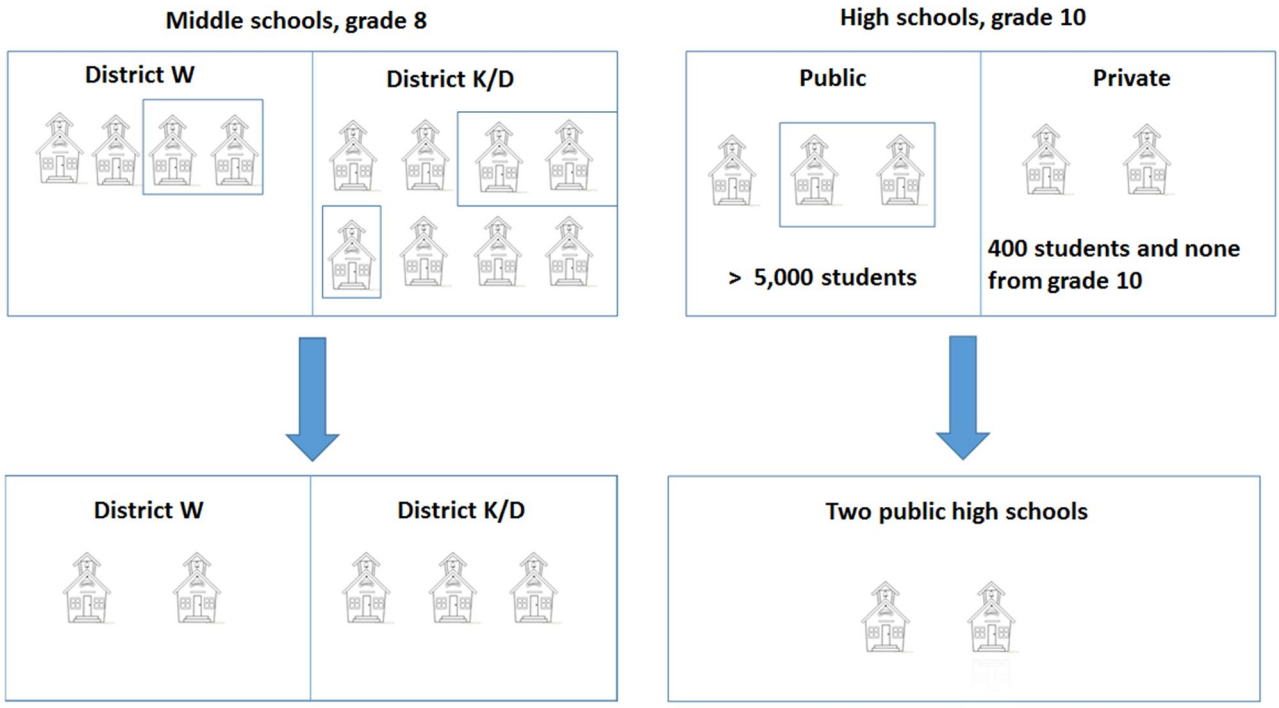

Figure 8. Flow chart of the sampling of participating schools in Weifang, China in 2014.

3.2.2 Instruments

3.2.2.1 Mental Health Continuum-Short Form (MHC-SF)

The MHC-SF representing the three dimensions of wellbeing is comprised of 14 items. A 6-point Likert scale is used for respondents to rate the different frequencies of the feelings that they experienced during the past month. The individuals who feel 1 of the 3 hedonic wellbeing symptoms 'every day' or 'almost every day' and feel 6 of the 11 positive functioning symptoms 'every day' or 'almost every day' in the past month are diagnosed as 'flourishing'. A diagnosis of 'languishing' is made if 1of the 3 hedonic wellbeing symptoms are felt 'never' or 'once or twice a month' and if 6 of the 11 positive functioning symptoms are felt 'never' or 'once or twice a month'. Individuals who fit neither of the diagnoses, 'languishing' or 'flourishing', are diagnosed as 'moderately mentally healthy' [59].

3.2.2.2 The Minneapolis-Manchester Quality of Life – Adolescent Form (MMQL)

The MMQL-Adolescent Form is a self-reported instrument that is used to assess the health-related quality of life in individuals aged 13 to 20 years of age [151]. The MMQL includes 46 items from the following 7 domains: physical functioning, cognitive functioning, social functioning, outlook on life, intimate relations, psychological functioning, and body image. MMQL was used in China for the first time in the present study, after being previously successfully tested in other countries, such as the United States, the United Kingdom, Sweden, South Korea, and Japan [151-155]. The instrument was used in Study II to evaluate the external validity of the Chinese version of MHC-SF.

3.2.2.3 The Hospital Anxiety and Depression Scale (HADS)

The Hospital Anxiety and Depression Scale (HADS) is a widely-used instrument comprising 14 items that examines psychological distress, namely anxiety and depression [156]. It was initially developed for patients who suffer from various diseases, but the scale has also shown high tolerance for general populations [157] and adolescents [158, 159]. This instrument has been psychometrically evaluated on Chinese adolescents before [159].

3.2.3 Translation procedure

The questionnaire was borrowed from an ongoing recurrent study known as the 'Survey of Adolescent Life in Västmanland' (SALVe) in Sweden [160]. This Swedish study was initiated in 1995, with the aim to investigate the health status of school children in Västmanland and to identify the trends in the health, lifestyle, and school life of this sub-population. The 2014 version of the SALVe questionnaire included the MHC-SF and several other items that were used to investigate the respondent's general health, degree of substance use, information technology exposure, school life, and socio-economic status. The questionnaire items were first translated into English by the main supervisor and then into Chinese by the PhD student. Back translation into English was conducted by the PhD student with the support of two researchers from China to check the quality of translation with the main supervisor. To keep the quality of translation, all translators were professional researchers in relevant subjects. Disparities in different language versions may still exist and lead to misunderstanding in such a multi-language process [161].

3.2.4 Variables

A number of socio-demographic variables were recorded in the questionnaire, including the respondents' 'gender', 'grade level', 'whether the respondent has siblings or not', 'perceived family economy' and 'family form'. 'Perceived family economy' was an item that reflected the respondent's understanding of their family's current financial situation across 7 possible levels, ranging from 'low' to 'high'. This variable was then condensed into three categories: 'poor', 'moderate', and 'good family economy'. The item has been validated internationally by Goodman et al [162]. The item 'family form' reflected whether the respondent lived with both parents or not [163].

The variables 'BMI', 'self-satisfaction of weight' and 'self-satisfaction of appearance' were grouped in three levels. 'Sleep quality', 'screen time', 'chronic stress', 'anxiety', 'depression', 'desire to learn', and 'physical activity' were dichotomized across the levels of 'low' and 'high'. The behaviors of 'smoking', 'drinking', and 'being bullied' included two categories; 'never' or 'occasionally or often'. 'Parental support' was measured by an index of 3 items that reflected perceived support for school life by parents (α=.81). 'Teacher support' was measured by an index of 4 items that reflected perceived support for school life by teachers (α=.91). 'Social trust' was measured by an index of 3 items that reflected the respondent's attitude towards society in a positive sense (α=.82). Table 3 shows the hypothesized indicators that were used in the present study, compared to other frameworks [163].

Table 3. Comparing the hypothesized indicators of positive mental health with previous frameworks.

Present study	Orphana et al. (2016)	Maher & Waters,WHO (2005) (children)	Parkinson (2007)
Sibling	Family: Household composition	Individual: Family indicator	
Family form	Family: Household composition	Individual: Family indicator	
Perceived family economy	Family: Family economy	Individual: Family indicator	Structural: Financial security/debt
BMI			Individual: healthy living
Satisfaction of self-weight		Individual: Sense of self and self-worth	
Satisfaction of self-appearance		Individual: Sense of self and self-worth	
Sleep quality			Individual: healthy living
Physical activity	Individual: Physical activity		Individual: healthy living
Stress			Individual: healthy living
Total screen time			Individual: healthy living
Smoking habit	Individual: Substance use		Individual: healthy living
Drinking alcohol	Individual: Substance use		Individual: healthy living
Social trust	Community: Social support	Individual: Sense of self and self-worth	Community: trust
Desire to learn	Community: School environment		Individual: Learning and development
Teacher support	Community: School environment	Organizational/ community	
Parental support	Family: Parenting style	Individual: Family indicator	Individual: Learning and development
Bullied at school	Community: School environment	Organizational/comm unity	

3.2.5 Statistical analysis

SPSS 22 for Windows was used to analyze the reliability and external validity of the MHC-SF, the prevalence of positive mental health, and the associations between multiple exposures and positive mental health. AMOS 22 was used to perform confirmatory factor analysis (CFA).

In Study II, internal consistency reliability for the MHC-SF was attained by calculating Cronbach's alpha coefficient for the MHC-SF total scale and each sub-scale. CFA was performed on single, dual, and three-factor models. Model fits were compared with each other in order to show the best model out of the three models, including Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR). A multi-group confirmatory factor analysis was performed in order to test the measurement invariance across gender and grade groups for the whole sample. External validity was assessed by comparing the strength of the correlation between measurements of positive mental health and measurements of illness and distress, i.e. MHC-SF and MMQL, with MHC-SF and HADS [164]. The strength of the correlations was evaluated using Fisher Z-transformation [165]. Differences between correlated correlation coefficients were tested using the method employed by Meng et al. [166].

In Study III, the prevalence of positive mental health was presented with proportions by categories of interest. Chi-square tests were performed so as to assess any differences in level-specific prevalence of positive mental health. Multivariate logistic regressions calculated OR and 95% CI by analyzing the variables associated with 'flourishing mental health' as the dependent variable. The regression analysis was performed in two steps. First, all potential indicator variables were checked for multicollinearity by performing a Spearman correlation analysis (Spearman coefficient $\rho S>0.70$). The variables were screened in a multiple logistic regression analysis using the Enter Method as the crude model. In the second step, the indicators with an estimate that was not significant in the crude model were dropped until all estimates in the model were statistically significant (the final model). The fit of the logistic models was assessed on the basis of the Hosmer-Lemeshow test. The Nagelkerke Pseudo-R^2 statistic was calculated to estimate the variance attributed to the predictors in a logistic regression model [163].

In the additional analysis, explanatory factor analysis (EFA) and CFA were performed in order to confirm the two-continua model. First, an EFA was performed so as to obtain insight into potential loadings and cross-loadings of the three sub-scales and items of 'depression'

and ‘anxiety’. Second, three CFAs were conducted. Each model included ‘positive mental health’ and ‘mental illness’ as a combined single factor, two orthogonal factors, or two related factors. Model fits were compared in order to show the best model out of the three models, including CFI, RMSEA and SRMR.

3.3 Ethical considerations

The Helsinki Declaration for medical research involving human subjects [167] was applied to the interviews. The basic principles invoked in this declaration include respect for people (‘respect a person's wishes’), beneficence (‘do the most positive good’) and justice (‘be fair’) [168]. In the policy study, the participants received information about (i) the aim of the study, (ii) the voluntary nature of their participation, (iii) their right to withdraw from the study at any time, and (iv) how confidentiality with respect to their participation in the study would be assured. After the above information had been orally provided to each participant, he or she signed a consent form. The research data does not include any sensitive personal data in terms of the participants’ identity or health data. Consequently, no ethical approval was required.

Because the ethical application indicated that consent would not be obtained from the parents of the participants, ethical approval was obtained in advance from the local administration at Weifang Medical University (China) for the survey study on March 1st, 2014. Permission by the headmasters and other administrators were obtained before the survey was conducted. Informed consent was given to the respondents at the beginning of the questionnaire in writing. Students volunteered to participate in the study and decided whether they wished to continue after they read the informed consent included at the beginning of the questionnaire. All of the participants remained anonymous during the whole research process.

4 Summary of results

4.1 Policy translation of adolescent mental health into local practices in China (Study I)

4.1.1 Context

China's first mental health policy was formulated in 1987 and its first national mental health law was passed in 2012 [103, 104]. Recently issued national policy documents include the National Mental Health Project of China: 2002–2010, the Proposal on Further Strengthening Mental Health Work and Guidelines for The Development of National Mental Healthcare System (2008–2015) [4, 106, 107]. An organised mental healthcare system has been gradually established since the People's Republic of China was founded in 1949, especially since the market-based reform was enacted [105]. In all 34 regions in China, the government has provided urban and rural residents, although not all, with Urban Resident Basic Medical Insurance (URBMI) and New Rural Cooperative Medical Scheme (NRCMS), both paid for by tax. The Ministry of Health and its local offices administer the mental healthcare system, which consists of public psychiatric hospitals which provide services for all citizens who have a health insurance to cover the treatment costs [103]. Individuals with severe mental illness are followed up by professionals at the psychiatric units at general hospitals and psychiatric hospitals. The conditions at these hospitals are monitored at a municipality level. Social and occupational rehabilitation services in hospitals, municipal health centres, and township health centres are available to support patients in their daily life. This system has been found to suffer from several policy-related problems, such as a lack of community-based psychiatric services, inadequate coverage of mental health services in the rural areas, poor standards of education, insufficient numbers of trained mental health professionals, and insufficient protection of the human rights of people with mental illness [103].

4.1.2 Content

Table 4 lists the official Chinese policy documents regarding adolescent mental health that were included in the analysis. According to the mental health law, schools at various levels and of various types should implement mental health education for their students, allocate or hire psychological health teachers or advisors, and may set up psychological health counselling rooms in order to educate students about psychological health [169]. Specific policy documents on adolescent mental health have been released, including Guidelines for

School Mental Health Education, Guidelines for Mental Health in Primary and Secondary Schools, and supplementary information [108, 109]. It is notable that the work of mental health promotion for adolescents is performed by the education administration. The central government defined the aims and goals and provided work strategies for the regional and local levels.

The administrative hierarchy in terms of the promotion of adolescent mental health consists of the national, provincial, municipal, and district levels. In the city of Weifang, the municipal education administration leads the work done with respect to mental health education for adolescents who attend schools. The local governmental department is responsible for implementing policies and programs from upper government levels, including national and provincial education administrations, and for the planning of mental health education based on local resources.

The focus of mental health programs for adolescents is the dissemination of knowledge about how to improve mental health. The government had launched a program to educate mental health advisors among school teachers. There is also local mental health education for school children and parents. The goal is to improve mental health for all students. In China, national guidelines have been developed for mental health education across all provinces, municipalities, and schools.

4.1.3 Process

The local education administration follows the guidelines set by the national and provincial administrations. Current proposals include three levels of policy mechanism. First, the mental health law defines broad governing principles. Second, national strategic guidelines, focusing on transferring basic knowledge about mental health and mental illness, present policy goals and specify the implementation process for the local administration. At the third level, the local administration introduces these guidelines and plans for action to school actors. Consequently, not much space is left for the local administration to enrich their strategy for improving adolescent mental health. One administrator at the local level stated:

> [Our goal is that] students receive preventive, non-treatment mental health education at school and enjoy a healthy and positive atmosphere created by the dissemination of knowledge.

Table 4. The official Chinese policy documents concerning adolescent mental health that were accessed.

Level	Policymakers/ authors	Title of the official document	Target group(s)
National	The Central People's Government of the People's Republic of China	Mental Health Law of the People's Republic of China [169]	The public
National	Ministry of Health	Guidelines for mental health education [109]	Politicians, officials, school staff, children, and adolescents
National	Ministry of Education	Guidelines for mental health in primary and secondary schools [108]	Politicians, officials, school staff, children, and adolescents
National	Ministry of Education	The notice of the national training program for mental health advisors in primary and secondary schools [170]	Politicians, officials, and school staff
National	Ministry of Education	Notice on the implementation of the plan to create outstanding primary and secondary schools with better mental health education [171]	Politicians, officials, and school headmasters
National	Ministry of Education	Notice on recommending the first national demonstration areas of mental health education in primary and secondary schools [172]	Politicians and officials
Regional	Shandong Provincial Education Department	Notice on strengthening mental health education in primary and secondary schools [173]	Politicians, officials, and relevant schools
Regional	Shandong Provincial Education Department	The plan to create outstanding primary and secondary schools with better mental health education in Shandong Province [174]	Politicians, officials, and school headmasters
Local	Education Department of Weifang	Notice on the Ministry of Education's guidelines for mental health education in primary and secondary schools [175]	Politicians, officials, and school staff
Local	Education Department of Weifang	Notice on mental health education courses for middle and high school headmasters [176]	School headmasters
Local	Education Department of Weifang	Notice on 'Student growth group counselling training' for primary and secondary mental health advisors [177]	School mental health advisors
Local	Education Department of Weifang	Notice on issuing 'The work plan for improving moral education for children and adolescents', the education Board of Weifang 2013 [178]	Politicians, officials, and school headmasters

The development of mental health policies for children and adolescents was identified as a need of moral education by the educational sector, according to one of the interviewees. Two main guidelines for mental health education in schools were released in 2012, when the mental health law was passed [108, 109]. Other guidelines were issued in 2015, in order to support mental health education with respect to counselling services in schools [179]. These national guidelines stipulated the goals, principles, means, stakeholders, implementation methods, and the human resources that should be made available for mental health education in detail, for all regions and schools in China. These guidelines, together with other national programs, for example, organizing competitions for all regions and schools in China (and, for example, 'Notice on the implementation of the plan to create outstanding primary and secondary schools with better mental health education' and 'Notice on recommending the first national demonstration areas of mental health education in primary and secondary schools'), were then distributed to the provincial education departments who, in turn, were obliged to repeat this process at the lower administrative levels. The whole transmission process was followed by identification of the local needs by administrators from the local education department. These local actors had to find a balance between showing the necessary respect for the national policies and lack of prerequisite in some local factors. Pressure was also exerted by local officials, such as mayors, on these local officials to take action with respect to the implementation of these policies.

4.1.4 Actors

The significant policy actors in China are part of the education system. According to the interviewees, the actors involved in the implementation process include local education administrations, school headmasters, school mental health advisors, and academia. The link between these actors is made manifest in terms of an administrative top-down approach, rather than systematic cooperation within groups on the same hierarchical level. The education administration dominates the policy process, assuming a self-assigned role of 'champion' in a hierarchical political system, by providing a framework for all actors at the lower levels to work within. However, some otherwise relevant sectors are not included in this approach, including the healthcare system, possibly because such involvement was not explicitly required by the central administration.

The role of 'mental health advisor' was established in response to the policy documents. Both mental health law and national guidelines state that the employment of mental health advisors in school is compulsory. Mental health advisors are the main workforce in mental health

promotion for adolescents, especially in school context. Some of these advisors were originally teachers and were licensed after receiving training, and others were recruited from graduate programs in psychiatry or psychology. All school mental health advisors are appointed by the Ministry of Education. With the passing of time, a lack in competence was discovered among mental health advisors. Certain adjustments were made, in terms of policy actions for this group, in an attempt to improve their competence and effectiveness. After this initial failure in assuring staff quality, the municipal education administration and schools have given priority to hiring staff with an academic degree in psychology or psychiatry and who previously worked full-time with mental health.

In summary, the policy context of the promotion of mental health in adolescents in China mainly refers to the national policies that are implemented by a top-down process in the education system. Before providing a psychometric evaluation of the MHC-SF and presenting a discussion of positive mental health prevalence and indicators, Study I contributes to the understanding of this field with an overview of the policy context in which adolescent mental health in China finds itself.

4.2 A psychometric evaluation of the MHC-SF on Chinese adolescents (Study II)

A total of 5,399 students from seven schools were invited to respond to the questionnaire. The response rate was 100% among the students who were at school on the day when the questionnaire was distributed. Of those who responded, 48.9% of participants were male. The mean age of all of the respondents was 15.13 years.

The Cronbach's alpha coefficient for the overall scale (α=0.92) demonstrated high internal consistency for the total of the MHC-SF. Coefficients for the subscales of 'emotional wellbeing' (α=0.92), 'social wellbeing' (α=0.83), and 'psychological wellbeing' (α=0.86) were all considered to be satisfactory.

Three types of conceptual models using the MHC-SF, based on theories and previous studies were tested: (a) a single factor model presenting 'mental health'; (b) a dual factor model presenting 'hedonic wellbeing' and 'eudaimonic wellbeing'; and (c) a triple factor model presenting 'emotional wellbeing', 'social wellbeing', and 'psychological wellbeing'. As Table 5 shows the fit indices of the one-factor and two-factor models indicated a poor fit of the models overall. The three-factor model demonstrated better model fits than the other models. Figure 9 presents the results of the confirmatory factor analysis for the three-factor model. Full configural and metric invariance was confirmed across 'grade' and 'gender'.

The correlations of the MHC-SF subscales with the subscales and total scales of the MMQL and HADS were all statistically significant. All of the MHC-SF scales correlated positively with the subscales of the MMQL while on the other hand, the subscales of HADS both negatively correlated with the MHC-SF. The strongest correlation found between the total scale of the MHC-SF and the total scale of HADS was statically significantly weaker than between MHC-SF and total scale of MMQL ($\Delta z > 1.96$). The instrument was thus proven to demonstrate adequate reliability, structural validity, and external validity in the sampled Chinese adolescents. This finding justified the test of the two-continua model and the assessment of prevalence and correlates of positive mental health.

Table 5. Maximum Likelihood Estimation of CFA Models of the Latent Structure of the MHC-SF terms.

Fit indices	One factor	Two factors	Three factors
df	77	76	74
RMSEA	0.159	0.117	0.086
CFI	0.775	0.878	0.936
Standardized RMR	0.073	0.059	0.057

Note. *df*=degree of freedom.

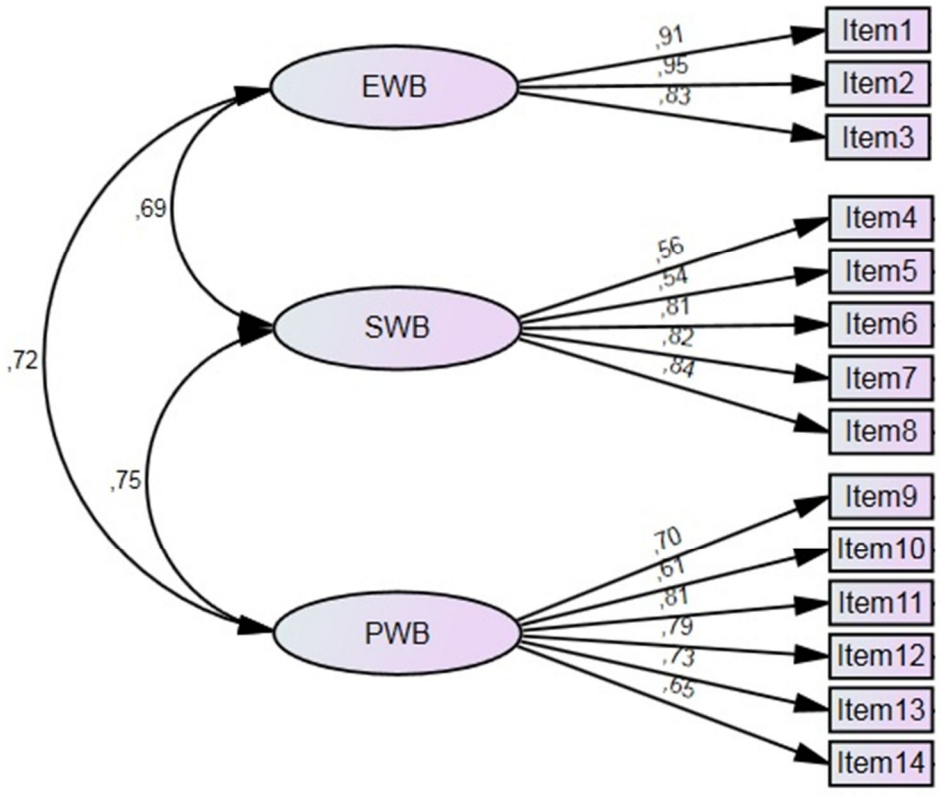

Figure 9. A confirmatory factor analysis of the three-factor model of the MHC-SF.

4.3 The prevalence of positive mental health in Chinese adolescents (Study III)

The results of Study III show that 57.4% of the participants were mentally healthy ('flourishing'), 37.4 % were moderately mentally healthy, and 5.2% were mentally unhealthy ('languishing'). The prevalence of positive mental health in the different sub-groups of Chinese adolescents varied. In Grade 8, 57.9% of the boys and 60.6% of the girls were identified as 'flourishing'. In Grade 10, 54.1% of the boys and 55.0% of the girls were diagnosed as 'flourishing'. Chi-square tests indicated significant differences in the prevalence of mental health in adolescents from the different sub-groups. In general, students in the lower grades, with rich families, having one or more sibling, and living with both parents self-reported as enjoying better positive mental health. Adolescents with lower BMI and higher degrees of satisfaction with respect to their own weight and appearance experienced higher levels of positive mental health. Better sleep quality and more physical activity were associated with a high prevalence of positive mental health. Students who suffered from stress reported a low prevalence of positive mental health. Adolescents reporting more screen time, and smoking and drinking habits showed less positive mental health. The greater the degree of social trust, a desire to learn, and perceived support from teachers and parents, the greater the levels of positive mental health. Finally, students who were bullied at school reported a lower prevalence of positive mental health than students who were never bullied.

4.4 Correlates of positive mental health in Chinese adolescents (Study III)

The results of the multivariate logistic regression analysis showed that 'gender', 'perceived family economy', 'having a sibling', 'satisfaction of self-appearance', 'physical activity', 'sleep quality', 'stress', 'social trust', 'desire to learn', 'teacher support', 'parental support', and 'not being bullied at school' were significant indicators of positive mental health in the crude model. Table 6 presents the final model with ORs and 95% CIs for all of the significant indicators with regards to positive mental health in the sampled adolescents. The strongest effect in the model was made by 'satisfaction of self-appearance' with an OR of 2.75. The final model explained 31% of the variance in positive mental health (Nagelkerke pseudo-R^2 = 0.310).

Table 6. The effect of indicators on positive mental health: Multivariate logistic regression – the final model.

Variables[a]		OR[b]	95% CI
Gender	Male	1.00	
	Female	1.31	1.13-1.52
Perceived family economy	Poor	1.00	
	Moderate	1.23	1.01-1.50
	Good	1.63	1.33-2.00
Sibling	0	1.00	
	1 or more	1.32	1.12-1.56
Satisfaction of self-appearance	Dissatisfied	1.00	
	Moderate	1.46	1.14-1.86
	Satisfied	2.75	2.15-3.51
Physical activity	Low level	1.00	
	High level	1.33	1.16-1.54
Sleep quality	Poor	1.00	
	Good	1.90	1.64-2.20
Stress	Often	1.00	
	Never or rare	1.41	1.14-1.73
Social trust	Low	1.00	
	High	2.53	2.18-2.93
Desire to learn	Weak	1.00	
	Strong or moderate	1.48	1.28-1.72
Teacher support	Low	1.00	
	High	1.43	1.23-1.66
Parental support	Low	1.00	
	High	1.73	1.49-2.00
Bullied at school	Occasionally or often	1.00	
	Never	1.44	1.25-1.66

Note. [a]Outcome variables were dichotomized in symptomatic and non-symptomatic categories.

[b]Each category presented was tested against the reference category (OR=1.00).

4.5 The two continua model of mental health in a Chinese context (Additional analysis)

In the EFA, it was expected that the depression and anxiety items (negative symptoms) would load onto one factor, and the scales of the MHC-SF (as the indicators of wellbeing) onto another factor. The results show that two separate factors were extracted. One factor was present with all of the subscales from the MHC-SF, and the other was present with both negative items. Table 7 shows that both subscales had the highest loading on the intended factor, demonstrating high factor loadings between 0.86 and 0.88.

Table 7. An exploratory factor analysis with two factors: mental health and mental illness.

Item/Subscale	Factor 1	Factor 2
	Mental health	Mental illness
MHC-SF:		
Emotional wellbeing	0.87	
Social wellbeing	0.88	
Psychological wellbeing	0.88	
Anxiety		0.86
Depression		0.87

Note. In the table, only loadings > 0.40 are presented.

As expected, the CFA revealed that the two-factor model (considering two related continua) fits the data best among all of the models in Table 8. The first analysis included a model with a single factor with both negative items and the scales from the MHC-SF. This model assumed the presence of mental health as the absence of mental illness. However, the results did not demonstrate that the model ideally fits the data. The second model included two orthogonal factors (first with the negative items, as the indicators of mental illness, and the second factor with the scales from the MHC-SF, as the indicators of mental health). Similarly, the model fit was not satisfactory.

Finally, a third model with two correlated factors was tested. An acceptable degree of model fit was found for the model with two distinct but correlated factors thereby lending support to the hypothesis that mental health and mental illness are distinct, but related dimensions, and are not the ends of a single continuum.

Table 8. Model fit coefficients of three confirmatory factor analysis – a verification of the structure of mental health and mental illness.

	Chi-square	***df***	**CFI**	**RMSEA**	**SRMR**
Model 1 – single factor	1551.989	5	0.826	0.242	0.125
Model 2 – two orthogonal factors	231.121	6	0.975	0.084	0.094
Model 3 – two related factors	30.510	4	0.997	0.035	0.012

Note. *df* = degree of freedom.

5 Discussion

5.1 Discussion of the results

Positive mental health has emerged as an important research topic. The shifting mental health landscape, consistent with the recent definitions of *mental health* as more than the absence of mental illness, poses a challenge to the promotion of mental health. In this thesis, for the first time positive mental health was assessed from different perspectives among Chinese adolescents. The MHC-SF was confirmed to be an instrument adequate to the task of evaluating positive mental health in the participants. Compared to many other countries, a higher level of positive mental health was found among the sampled Chinese adolescents. Furthermore, girls demonstrated a slightly higher level of positive mental health than boys. The indicators found to significantly improve positive mental health among the sampled Chinese adolescents were categorized to be on the family level, the school level, and on an individual level. Positive mental health was also confirmed to be correlated to, but distinct from, mental illness, which is also consistent with the WHO definition of *mental health*.

The general context of the society in which the Chinese adolescents live was described in Study I. It was noted that national policies are implemented in a top-down process, in which the Ministries of Health and Education instruct provincial and local levels in detail on how they should proceed with providing education about mental health among students. The ministries are thus very strong policy-makers in this process at the national level, while the school administration plays an important role in policy translation, from interpreting the legislation and policy to implementing it in action on the provincial and local levels. At the local level, the policy actors are mainly found in the education sector and the content of the policies could be classified as 'moral education', 'knowledge dissemination', and 'learning', rather than 'counselling and treatment', which is more common in countries like the United States and Sweden [180]. In many western countries, policy translation is usually identified as a bottom-up process; where local policy actors form their own opinion about the tasks that need to be completed and, accordingly, change the given programs in order to better adapt them to local circumstances [181]. In Sweden, for example, political decisions are made at the local level, while the relevant legislation and general guidelines are given at the national level [182]. The Swedish government decides on the legislation and provides funding and guidelines for mental health programs. Most of the political responsibility is decentralised to the local level (municipalities) in Sweden. In China, such responsibility is taken on by the central government [183].

The results of Study II indicate adequate reliability and validity of the MHC-SF, the instrument that was used to assess positive mental health in the sampled adolescents. This assessment constitutes the base study of the epidemiological research presented in this thesis. High internal consistency was found for the total scale of the MHC-SF as well as the subscales, which is in agreement with other studies that have found excellent internal consistency (> .80) with respect to the MHC-SF in adolescents [64, 65] and adults [53, 62-64, 66, 67] in other countries, for example, Denmark, India, Italy, South Korea, and the United States. A confirmatory factor analysis provided robust support for the three-dimensional factor model, with results much in agreement with recent European, Asian, and American studies [53, 62-68, 184]. The results of the present study are similar to previous studies on adolescents, with a CFI greater than 0.90 [64, 65, 68] and an SRMR of less than 0.10 [64, 68]. Previous studies have also shown support for the external validity of the MHC-SF in terms of the correlations between the MHC-SF and 'anxiety' and 'depression' [53, 62-68] as well as 'health-related quality of life' [62, 63, 65-67]. Overall, the adequate reliability, structural validity, and external validity have been confirmed in a Chinese setting, in a manner similar to many other European, America, Asian, and African countries [53, 62-68, 70, 73, 185].

Using a psychometrically sound instrument MHC-SF to assess positive mental health, Study III revealed a high prevalence of positive mental health among the sampled Chinese adolescents (57.4%) compared to previous studies. Note that the prevalence of positive mental health in the United States, South Africa, Poland, South Korea, Italy, and Egypt ranged between 10% and 30% in different age groups [57, 62, 64-66, 73]. One explanation for this difference could be the economic development that has taken place in China during recent years, and the fact that the study was conducted in an area with a strong economy. The relationship between the general economic situation of a country and the individual's mental health has been shown previously [186]. In China, the rapid economic growth that has taken place during the past few decades has stimulated the people living there in many aspects. According to the Pew Research Center, 90% of Chinese rated the economic conditions of their country as 'good', which was the highest rating among all of the 40 countries that were included in the survey [187]. Furthermore, 88% of the Chinese respondents in the Pew study believed that when today's children grow up, they will be better off financially than their parents. Another survey showed that the Chinese public was optimistic about their long-term economic future; 'in particular, their positive outlook stands in stark contrast to the pessimism found in the United States and much of Europe' [188]. Such a situation may have effects on the positive mental health of young people, especially those who live in wealthy areas like

Weifang. In this thesis, 'social trust' had the strongest correlation with positive mental health (OR=2.53, 95% CI=2.18-2.93), which supports this hypothesis.

The multivariate logistic regression analysis that was conducted in this study shows that 'gender', 'perceived family economy', 'the presence of sibling(s)', 'satisfaction with self-appearance', 'physical activity', 'sleep quality', 'stress', 'social trust', 'desire to learn', 'teacher support', 'parental support', as well as 'not being bullied at school' were significant indicators of positive mental health (with ORs ranging from 1.23 to 2.75). These results are consistent with a number of the factors listed in Figure 4 [15]. 'Females' were associated with slightly better positive mental health than 'males'. Previous studies using the MHC-SF have not shown any significant difference in the positive mental health between genders in adults and adolescents [42, 45, 53, 64, 74]. One of the possible causes for the slightly higher prevalence of positive mental health among Chinese girls is that girls perceive that they are in a better relationship with their parents than boys in China [189]. In terms of overall mental health, previous studies show that in western countries like Sweden, girls report lower life satisfaction and more mental problems as time goes by [43, 190]. Such demonstrated differences between countries need further investigation.

In the additional analysis included in this thesis, the two-continua model with correlated factors of positive mental health and mental illnesses showed the best fit among all of the other models that were tested. 'Positive mental health' and 'mental illness' were confirmed to be two related, but distinct, indicators instead of instantiating two opposite ends of a single continuum. Among all previous studies that have included an EFA with respect to 'positive mental health' and 'mental disorders', the present study has shown higher and less discrete factor loadings (0.86-0.88) on the intended factors than, for example, the Dutch study (0.52-0.90) [63] and the Polish study (0.58-0.83) [64]. Similarly, the model fit of the two-continua model in the present study shows superior divergent validity (CFI=0.997; RMSEA=0.035; SRMR=0.012) compared to the previous study from the United States (RMSEA=0.06) [57], the Dutch study (CFI=0.976/0.979; RMSEA=0.077/0.065; SRMR=0.081/0.082) [63] and the Polish study (CFI=0.964; RMSEA=0.087; SRMR=0.050) [64]. These results are in agreement with similar studies conducted in the United States, the Netherlands and Poland [57, 63, 64], and with the WHO definition of *mental health* [8]. Consequently, once again support is given to the hypothesis that mental health is a complete and independent state of health and not merely absence of mental disorder.

The studies that are included in this thesis were performed from different perspectives; but all of the studies contribute to the understanding of the worldwide research topic of mental

health among adolescents. By synthesizing these studies, this thesis has shed new light on the topic, with respect to the city of Weifang in China. The policy translation regarding the promotion of positive mental health among Chinese adolescents is found to be a top-down process. The application of the MHC-SF turns out to be reliable and valid with respect to the evaluation of positive mental health. The high level of positive mental health demonstrated the sampled Chinese adolescents (as assessed by the MHC-SF), to some extent, reflects the recent economic development that has taken place in China and the increasing level of confidence that is felt among Chinese young people. It is also worth noting that 'positive mental health' and 'mental illnesses' have been proven to be correlated but distinct.

5.2 Methodological considerations

This thesis consists of a cross-sectional study, involving data that was collected at a single point in time. This means that the outcomes with respect to the participants were measured at the same time [191]. Consequently, deriving a causal relationship between outcomes and various indicators is not possible. Notwithstanding this, the prevalence of 'positive mental health' and the ORs regarding 'positive mental health' and multiple exposures can be estimated.

An additional strength of the present survey study is that the sample size is larger than previous studies that have utilized the MHC-SF, as listed in Table 1 [53, 57, 62, 64-66, 68, 73, 74]. Sample size is essentially related to the statistical power of the study. A sufficient sample size enables the researcher to detect true differences in outcome between groups and allows for subgroup analysis to be performed within the study, whilst maintaining adequate statistical power [192]. Therefore, the relatively big sample size in the survey study assures the statistical power of the research.

A methodological aspect that touches on the validity of the study is the selection bias that is present in the survey study [193]. Selection bias occurs when a properly randomized selection of individuals is not achieved or the sample is not representative of the population that it is derived from [193]. In such cases, the generalization of the study will be weakened. All of the respondents in the survey study were students from sampled schools in urban areas of Weifang, a city ranked in the top 10% out of approximately 300 cities in terms of their GDP in China [140]. Previous studies found that the mental ill health of Chinese adolescents is associated with their socio-economic status [135, 136], while the economic equality, between urban and rural China, still exists [194]. Thus, a different level of positive mental health among adolescents who live in rural areas of Weifang may be expected. This possibility was

not investigated in the current study. Furthermore, this research was performed in an economically developed area of China. Thus, average family income levels might be higher for the participants than in other less developed areas of China, considering the regional disparities in income levels that exist in China [195] and thus may give cause to a rise in the level of positive mental health. To reduce the selection bias, a stratified and clustered random sampling scheme was employed in two unequally socio-economically developed urban districts of Weifang, so as to maximize the representativeness of the sample.

Moreover, in the policy study, a limited number of interviews were conducted. There were, in total, three interviewees, which may have led to a lack of sufficient information. However, the key actors involved in the adolescent mental health work, including a department head of the educational administration, a coordinator of adolescent mental health promotion, and a school mental health advisor, were included in the study and were able to provide information on policy making and policy actors at other levels in the system. Moreover, a large number of policy documents from the central, provincial, and local levels, for example, legislation documents regarding adolescent positive mental health, were included in the analysis, thereby enriching the empirical data used in the study.

Cultural and translation considerations were considered to be important issues [196, 197]. Topics like a person's sexual behaviors, drug and alcohol use, smoking, and issues of trust in society are more sensitive in the Chinese culture than in Sweden, for example. Also, the meaning of words may change when a text is translated into another language [198]. The questionnaire was originally developed to assess the positive mental health and life factors of Swedish children and adolescents. In order to perform a study in a Chinese setting, the researchers in Sweden and China had to translate the questions into English and then Chinese and then make slight changes to some questions in order to address existing cultural differences. For example, 'ice hockey' was replaced by 'table tennis' in the items related to doing sports. Several techniques were used to determine the quality of the translation [198]. Blind back-translation was performed after the preliminary translation into the target language. Pilot testing of the pre-final version of the instrument gave rise to a number of comments by a small sample of students from the target population. Thus, the readability and cultural acceptance of the questionnaire was assured. The small pilot study was conducted on a group of 285 school students. After this verification process, the main study began. Psychometric evaluation of the main instrument confirmed its structure, reliability, and validity. However, little was known regarding how the culture differences might affect the answers to the questions in Chinese.

The response rate was 100%, which means that all of the sampled students, except those students who did not attend school on the day questionnaires were distributed, agreed to participate in the study, and did so. This is different from the situation in western countries, where researchers find that the response rate to survey studies is lower, for example 70-80% for similar studies in Sweden [199, 200]. The high response rate in the study is probably associated with the collectivistic feature of the Chinese culture, which values obedience and respect for one's parents, teachers, and other authority figures [197]. The students may have automatically ignored the option where they could refuse to participate when teachers distributed the questionnaires, although this option was available to them according to the consent form. Instead, some students may not answer the whole questionnaire. This outcome was predicted in the study design, thus all of the scales regarding 'positive mental health', 'quality of life', and 'anxiety' and 'depression' were placed at the beginning of the questionnaire. These items were followed by the 'life and school' factors used in Study III. The average percent of missing data per item is approximately 5%, particularly by those questions that did not focus on what is reported on in this thesis, including items related to 'sex' and 'relationships'. Multiple methods for dealing with missing data were considered and compared with each other, that is to say maximum likelihood and multiple imputation. However, all methods are prone to cause statistical problems and it was advised to avoid computing new values for missing data [201]. Therefore, it was decided that no method for dealing with missing data would be used, thereby ensuring a set of unbiased results.

Notwithstanding the above remarks, two different ways of collecting the questionnaire data were used and this may have impacted on the results to some extent. In three of the sampled schools, the students completed the questionnaire at home and returned it to their teachers the following day. In the other four schools, students completed the questionnaires in the classroom, during a given one-hour period. Hence, the concern was whether the respondents who took the questionnaires home were influenced by their peers and parents whilst they completed the questionnaires [202]. For example, did they report that they had a better mental health in order to avoid having the information that they had voluntarily provided made public or used against them? To answer this question, the author of the thesis revisited the distribution patterns demonstrated by these two student groups. All of the participants from Grade 10 filled in the questionnaires at home, whereas most of the participants from Grade 8 completed the questionnaire at school. Thus, any such significant difference between the groups would be confounded by age. In terms of the factor structure of MHC-SF there was no statistically significant difference, since additional CFA confirmed the full configural and metric invariance across the two groups (ΔCFI =0.001, ΔRMSEA=0.003, ΔSRMR=0.005). In

the regression analysis, the variable ‘collection method’ was not significantly associated with positive mental health in the crude model, thereby indicating that the difference in the ways the questionnaire was completed had no effect on the respondents’ reports of positive mental health.

Underreporting is considered to be a potential problem and might introduce bias in the results in a survey study. It is not uncommon for participants to underreport on some items commonly considered to be inappropriate (either thoughts or behaviors) [202]. For example, ‘smoking’ was not found to be associated with positive mental health, which may be biased by underreported smoking habits. In this thesis, only 7.0% of the participants reported current or previous smoking. However, the prevalence of smoking in Chinese adolescents is generally much higher (11%-46% for boys and 2%-15% for girls) [203]. Considering the fact that smoking among males is a severe public health problem in China [204], the relatively low reported prevalence of smoking among the adolescents included in the study was surprising. However, there was no opportunity for the researchers to revisit the participants and explore the ‘truth’ of their smoking habits. Future research may focus on this indicator by employing improved techniques to measure smoking and other ‘inappropriate’ behaviors.

6 Conclusion

'Positive mental health' has emerged as a significant area of research and has attracted many researchers' attention over the years. Various studies have been conducted in many countries across Asia, Europe, America, Africa, and more. However, studies on positive mental health in China are rare, especially with respect to adolescents. This thesis has presented an analysis of several different aspects of positive mental health in adolescents in Weifang, China. This was done in order to investigate these aspects with respect to positive mental health in Chinese adolescents for the first time, in a comprehensive manner.

The mental health policies for adolescents in China are translated by a top-down process, ultimately focusing on knowledge dissemination, which is carried out within the education system. The policy context includes mental health policy and law, and the mental healthcare system in China. Legislation and policy planning at the central level of government defines the content of policy implementation. School administrators and mental health advisors are important policy actors in the mental health promotion (Study I).

The MHC-SF, the instrument that was used to assess positive mental health, proved to be reliable and valid for the sample of Chinese adolescents. The findings in the present study are consistent with previous studies that have been performed in other countries, indicating that the MHC-SF is an instrument adequate to the task of measuring positive mental health among adolescents in the future (Study II).

The level of positive mental health of the sampled Chinese adolescents (57.4%) was higher than that found in most previous studies using the MHC-SF. The advantageous socio-economic status of the research setting, the City of Weifang, might be associated with the high prevalence of positive mental health. Further investigation on the level of positive mental health in adolescents living in other parts of China is required to confirm this hypothesis (Study III).

Adolescents who enjoy an advantageous socio-economic status, life-style, social support, and a supportive school life are significantly associated with better positive mental health. These findings confirm previous research into the positive mental health of adolescents (Study III).

The findings of this thesis generate a number of implications. 'Mental health' is shown not to be equal to the absence of mental illness in the sampled Chinese adolescents. As a result of this observation, successful treatment of mental disorders in some individuals will not automatically lead to the improvement of a population's mental health. Instead, the

promotion of mental health in the form of specific programs that deal with mental health in the positive sense – targeting all adolescents at school – should be encouraged. Drawing on the identification of which indicators improve positive mental health, policy planning should support (i) a financially-sound family-life that provides parental support, (ii) a life-style that promotes physical activity and enough sleep, while avoiding stress, and (iii) a school environment that offers teacher support and prevents bullying.

Based on the findings of this thesis, several topics for further research can be identified. The prevalence of positive mental health in Chinese adolescents from rural areas, other provinces, disadvantaged socio-economic status, and age groups needs to be assessed, in order to verify the findings in this thesis. Studies on how national culture might influence the positive mental health of adolescents from China, and other countries, would also add important knowledge to the emerging research area of 'positive mental health'. Future research might also focus on the performance of policy processes and on efforts made to promote mental health for adolescents, within in the Chinese school system.

7 Acknowledgements

Thanks to the support from many people in Sweden and China, my PhD work has come this far. All respondents, including middle school and high school students, education officials and school mental health advisors from Weifang contributed to the study by providing valuable information.

I would like to thank for the ideas and guidance from my main supervisor Professor Christina Keller, co-supervisor Professor Göran Tomson and Fredrik Söderqvist. Christina has contributed to the project with great energy. She observed in part of the interviews and questionnaire survey in China. I have benefited from her expertise in academic writing. Also, she was in contact many times with *Migrationsverket* (Swedish Migration Agency) and *Stockholms studentbostäder* (Stockholm Student Housing) to make my life in Sweden easier. Göran has given his valuable comments for thousands of times, during the intervals of his important flights to Geneva, New York, London and so on. I will always remember what he said, 'You know much more than you think. And write this in your Acknowledgement.' Fredrik also provided valuable comments on positive mental health and statistical analysis from the beginning to the end of the PhD work. All the contributions from the supervisors encouraged me to face with any challenge in my work.

My mentor, Dr Lars Cenerud is the person who has known me for ten years. He introduced the Swedish research project 'Liv och Hälsa' to me and everything started there. I learned a lot and benefit for life from his personality and understanding of public health. I am grateful to his long-term support as a mentor and friend.

I would like to thank the researchers and assistants from Weifang Medical University, China who contributed to the study. Professor Jizhi Guo and Xiangyun Li had extensive contact network to initiate the data collection in Weifang. Shuxiang Yang, Lihui Zhuang, Hongjing Wang, Yuqi Shen, Han Zhang, Ruimei Wang, Yanlei Pang and Runguo Gao contributed to administrating questionnaires and collecting data. Yuqi Shen, Han Zhang and Ruimei Wang also managed to enter responses to the computer-based dataset.

Many thanks to Professor Kristina Burström for her detailed comments on the thesis, and Professor Gert Helgesson for his advice on the ethical issues regarding the research project.

I am grateful to Sara Elg, former PhD ombudsman and Ingeborg van der Ploeg, central director of studies at KI for their support for my PhD studies whenever I came across problems in my work.

I would like to thank the colleagues in Department of Learning, Informatics, Management and Ethics. Thanks to Professor Mats Brommels and Professor Carl Johan Sundberg, former and current head of the department respectively, for their generous support. Tomas Månsson and Ingrid Smedberg, the directors of study, have given me good advices during the years I spent at LIME. Mette Gladden, secretary of the head of department, has facilitated my research. Mesfin Kassaye Tessma kindly gave advice on statistical analysis.

Last but not the least, I would like to thank my family for their eternal support. Thanks to my parents, who are the persons that I can always fully rely on. Being away from home for several years, I still have their unconditional support and encouragement. Special thanks go to my husband Minghao Lin, who received his PhD two years earlier, for his patience, high tolerance and understanding for everything. His support has been essential to me since we met each other in 2005. This thesis is a gift to him with deepest love before the new adventure for life together.

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9 Appendix - the questionnaire used in the survey study (in English)

Informed consent

We invite you to participate in a Sino-Swedish collaborating study on adolescent mental health. Please read the following carefully before you agree to participate in the survey.

Purpose of the survey

We aim to investigate the mental health status of young people in Weifang, China and Västmanland County, Sweden. The questionnaire includes items regarding your health, family, study, psychological feelings, values and beliefs. The main topic of this survey is mental health and quality of life.

Inclusion

The survey involves a total of about 5,000 students aged 15 and 17 in nearly 10 secondary and high schools in Weifang.

General information

The researchers perform the survey in secondary and high schools through sampling method. We need you to provide your general information, life experience and complete the questionnaire. Your participation will support the promotion of mental health education for middle school students in the future research.

Possible inconvenience brought to you

Taking part in this survey will not cause any potential risk to you except for spending about 60 minutes. Your participation in this survey will not cause any cost.

Benefits of participating in the survey

By participating in this survey, you will contribute to the mental health promotion of middle school students in China and the development of healthcare system.

Confidentiality

All your personal identity information in this survey will be strictly kept confidential and will not appear in any of the study results or any documents that introduce and publish this study.

Voluntary principle

Your participation is voluntary and you have the right to withdraw at any time. If you have any question about this survey, please contact the researchers who perform the survey.

Informed statement

Based on the anonymity principle, if you are willing to continue to respond to the questionnaire after carefully reading the informed consent, we consider that you voluntarily participate in this survey.

Adolescent Mental Health Research Group

Weifang Medical University

March 31, 2014

Life and health – Adolescent 2014 Weifang

Your life and health

You are hereby asked to participate in a study about adolescent health. Your participation is voluntary. The study is performed by the researchers from Karolinska Institute (Stockholm, Sweden) in collaboration with Weifang Medical University (China). Such studies have been performed for 8 times since 1995 in Västmanland, Sweden. The questionnaire includes items about how you perceive your health, family, school life and leisure time. **The theme of this year's is mental health and quality of life**. The questionnaire is prepared for the students in Grade 8 and 10 in secondary and high schools in Weifang.

Who can read my answer?

No one can connect the answers to you personally. No one knows which student filled in which questionnaire. We do not collect personal identity data of any participant in the study. The numbers appearing on the questionnaire (if exist) are used to connect with the research dataset. Your answer will not be exposed to any person or organization that can connect it to you.

It is important that you participate!

It is very important that you and your peers participate in the study. By participating you will contribute to creating the knowledge of adolescent health. It is impossible to visit all the adolescents in a certain age group, but the survey can provide your views. It is also important that you and your classmates feel that you can respond the questions honestly and that no one else can see what you have written. For that reason, we will ask you not to talk to each other while filling in the questionnaire.

How do I fill in the questionnaire?

Tick the alternative that applies best to you ☑

<u>Below is an example of how to circle an alternative on a timeline:</u>

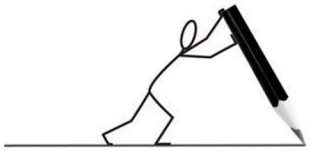
Only tick one alternative unless the instructions say something else. Use a black or blue ball pen. If you tick the wrong alternative by mistake, cross it out and tick the right alternative.

It is important that you answer all questions. If you are uncertain, chose the alternative that applies best to you. It is often the first alternative you come to think of!

When you complete the questionnaire

Check if you forget any page or question. Then your questionnaires will be taken into large envelopes.

L



Let's begin!

Welcome to the questionnaire – the first questions are about the quality of life

When you answer the questions about quality of life and mental health below, remember that it is you who judge your qualities. There are no right or wrong answers. The main thing is that you provide the answers that you currently think best describes how you feel or think. Be sure to answer all questions even though some of them might seem similar.

How well do these statements apply to you?	Very true	Partly true	Neither true nor false	Partly false	Very false
1. I have a lot of energy	☐	☐	☐	☐	☐
2. I need time to rest during the day	☐	☐	☐	☐	☐
3. I have a lot of energy to run and do sports	☐	☐	☐	☐	☐
4. There are many things that I cannot do because of my health	☐	☐	☐	☐	☐
5. There are many things that I cannot do because of problems with my arms or my legs.	☐	☐	☐	☐	☐
6. I'd rather watch than participate in games and sport	☐	☐	☐	☐	☐

How often do you feel?	Never	Seldom	Sometimes	Mostly	All the time
7. Sad	☐	☐	☐	☐	☐
8. Angry	☐	☐	☐	☐	☐
9. Tired during the day	☐	☐	☐	☐	☐
10. Lonely	☐	☐	☐	☐	☐
11. Scared	☐	☐	☐	☐	☐
12. Anxious or nervous	☐	☐	☐	☐	☐
13. Strong and healthy	☐	☐	☐	☐	☐
14. Worried about dying	☐	☐	☐	☐	☐
15. Worried about my health	☐	☐	☐	☐	☐
16. Worried about things in general	☐	☐	☐	☐	☐
17. Not as good as the others (inferior to them)	☐	☐	☐	☐	☐

Your body and your appearance	Very satisfied	Rather satisfied	Rather dissatisfied	Very dissatisfied
18. How satisfied are you with your weight?	☐	☐	☐	☐
19. How satisfied are you with your appearance?	☐	☐	☐	☐
20. How do you feel about your body's development right now?	☐	☐	☐	☐

	Very true	Partly true	Neither true nor false	Not very true	Not at all true
21. I like my body the way it is	☐	☐	☐	☐	☐

How well do these statements apply to how you feel about your physical development?	Agree completely	Agree	Neither agree nor disagree	Disagree	Disagree completely
22. When others look at me they think that my physical development is slow	☐	☐	☐	☐	☐
23. I am not comfortable with my the development of my body	☐	☐	☐	☐	☐

Relationships and hobbies	Completely true	Fairly true	Neither false nor true	Not very true	Not at all true
24. I find it hard to make friends	☐	☐	☐	☐	☐
25. I feel left out in groups of people my own age	☐	☐	☐	☐	☐
26. Others like stay with me	☐	☐	☐	☐	☐
27. I have a lot in common with my friends	☐	☐	☐	☐	☐
28. I get on well with other people my own age	☐	☐	☐	☐	☐
29. I have a lot of close friends	☐	☐	☐	☐	☐
30. I have similar interests as other people my age	☐	☐	☐	☐	☐
31. Being together with others gives me a good feeling	☐	☐	☐	☐	☐

	Never	Seldom	Sometimes	Mostly	Always
32. Do you have difficulties to focus in school?	☐	☐	☐	☐	☐
33. Do you have difficulties to focus on other occasions (for example when playing games, computer games and reading)?	☐	☐	☐	☐	☐
34. How often do you think it is difficult to do homework or to study?	☐	☐	☐	☐	☐
35. How often do you need more help with school work than others in your class?	☐	☐	☐	☐	☐

Please indicate how many difficulties you have.	None	A little	Some	Fairly much	A lot
36. How difficult is it to remember things in school? (or at work, if you have one)	☐	☐	☐	☐	☐
37. How difficult is it to focus on school? (or work, if you have one)	☐	☐	☐	☐	☐
38. How difficult is it for you to read and write?	☐	☐	☐	☐	☐
39. How difficult is it for you to do math and calculations?	☐	☐	☐	☐	☐
40. How many difficulties do you feel that you have in school work compared to others in your class?	☐	☐	☐	☐	☐
41. How difficult is it to handle your own/others' demands on you in terms of school work	☐	☐	☐	☐	☐

More about relationships	Very true	Fairly true	Neither true nor false	Not very true	Not at all true
42. I think that it is easy to have a physically close relationship	☐	☐	☐	☐	☐
43. I feel confident being with people of the opposite sex	☐	☐	☐	☐	☐

How well do this statements apply to your view of life?	Agree completely	Agree	Neither agree nor disagree	Disagree	Disagree completely
44. I am content with how things are	☐	☐	☐	☐	☐
45. I am content with life in general	☐	☐	☐	☐	☐
46. In general, I am satisfied with my current life situation	☐	☐	☐	☐	☐

Questions about your mental health

47. During the latest <u>month</u>, how often have you felt… *(Tick one alternative in every row)*

	Never	Once or twice	About once a week	About. twice or three times a week	Nearly every day	Every day
happiness, joy	☐	☐	☐	☐	☐	☐
an interest in life	☐	☐	☐	☐	☐	☐
content/satisfied	☐	☐	☐	☐	☐	☐
that you have something important to contribute to society	☐	☐	☐	☐	☐	☐
that you belong to a community (for example a group of people or a club)	☐	☐	☐	☐	☐	☐
that our society is becoming a better place for all people	☐	☐	☐	☐	☐	☐
that people are basically good	☐	☐	☐	☐	☐	☐
that the way society works is logical	☐	☐	☐	☐	☐	☐
that you like most of your own personality	☐	☐	☐	☐	☐	☐
that you take responsibility for your daily life	☐	☐	☐	☐	☐	☐
that you are going somewhere in life and that life has a purpose	☐	☐	☐	☐	☐	☐
that you have warm and confident relationships with others	☐	☐	☐	☐	☐	☐
that you experience things that will make you grow as a person	☐	☐	☐	☐	☐	☐
that you have the confidence to have your own thoughts and opinions and that your dare to express them	☐	☐	☐	☐	☐	☐

Questions about your existential health

The following questions are about your basic values, such as personal, spiritual and religious beliefs. The questions are phrased as to be applicable to people from different cultures with different spiritual, religious and personal beliefs. A personal belief can but does not have to be religious. It can be connected to for example ideologies, philosophy or science. *(Tick one of the alternatives in every questions)*

48. To what extent do you experience your life as meaningful??

Not at all	A little	Moderately	To a large extent	To an extremely large extent
☐	☐	☐	☐	☐

49. To what extent do you feel that your life has a purpose?

Not at all	A little	Moderately	To a large extent	To an extremely large extent
☐	☐	☐	☐	☐

50. To what extent do you have a belief that brings you comfort/relief in everyday life?

Not at all	A little	Moderately	To a large extent	To an extremely large extent
☐	☐	☐	☐	☐

51. To what extent are you optimistic about your life?

Not at all	A little	Moderately	To a large extent	To an extremely large extent
☐	☐	☐	☐	☐

52. To what extent do you experience inner peace?

Not at all	A little	Moderately	To a large extent	To an extremely large extent
☐	☐	☐	☐	☐

53. To what extent do you feel that your way of life is consistent with your feelings and your thoughts?

Not at all	A little	Moderately	To a large extent	To an extremely large extent
☐	☐	☐	☐	☐

54. To what extent is spiritual strength improving your life?

Not at all	A little	Moderately	To a large extent	To an extremely large extent
☐	☐	☐	☐	☐

55. To what extent do you marvel when you look at things around you (for example, to be fascinated by nature, art and music)

Not at all	A little	Moderately	To a large extent	To an extremely large extent
☐	☐	☐	☐	☐

56. To what extent do contact with a spiritual dimension help you to cope with hardship?

Not at all	A little	Moderately	To a large extent	To an extremely large extent
☐	☐	☐	☐	☐

Questions about your sleep and sleep quality

57. When have you usually gone to bed on weekdays during the latest month?

Hour ☐☐ : Minute ☐☐

58. How many minutes did it usually take for you to fall asleep in the evening after going to bed on weekdays during the last month.

Number of minutes: ☐☐☐

59. When did you usually rise in the morning on weekdays during the last month?

Hour ☐☐ : Minute ☐☐

60. During the last month, how often did you have sleeping problems caused by

	Not during the latest month	Less than once a week	Once or twice a week	At least three times a week
not being able to fall asleep within 30 minutes	☐	☐	☐	☐
wake up in the middle of night or early morning	☐	☐	☐	☐
need to get up to go to the bathroom	☐	☐	☐	☐
have trouble breathing	☐	☐	☐	☐
cough or snore loudly	☐	☐	☐	☐
is cold	☐	☐	☐	☐
think it is too hot	☐	☐	☐	☐
have unpleasant dreams	☐	☐	☐	☐
have pain	☐	☐	☐	☐
any other cause	☐	☐	☐	☐
Have you taken any medication to help you sleep during the last month	☐	☐	☐	☐
Have you had difficulties to keep awake when attending lessons, having meals or when spending time with others during the last month.	☐	☐	☐	☐

	No problem at all	Less than once a week	Once or twice a week	At least three times a week
How much trouble did you have during the last month to maintain sufficient enthusiasm to get things done	☐	☐	☐	☐

	Very good	Fairly good	Rather bad	Very bad
How would you generally assess your sleep quality during the last month	☐	☐	☐	☐

Questions about you and your family

61. Are you a boy or a girl

☐ Boy ☐ Girl

62. How old are you?

☐☐ **Years**

63. How do you live? *(If you live in multiple places, choose the alternative where you spend most time).*

☐ In a rented apartment

☐ Family owned housing, less than 50 sqm

☐ Family owned housing, between 50 and 100 sqm

☐ Family owned housing, more than 100 sqm

64. Where do you live? *(If you live in multiple places, choose the alternative where you spend most time).*

☐ Weicheng District ☐ Kuiwen District ☐ Others

☐ ☐ ☐

65. What about holiday travel?

	None	Once	Twice	More than twice
During the last 12 months, how many times did you go on holiday travel with your family?	☐	☐	☐	☐

66. Who do you live with? *(Tick the alternatives that apply for you)*

- ☐ Mom
- ☐ Dad
- ☐ Sometimes mom, sometimes dad
- ☐ One or more siblings
- ☐ Stepmom
- ☐ Stepdad
- ☐ Other adult relative
- ☐ Live alone with boyfriend or girlfriend
- ☐ Foster family
- ☐ Any other adult
- ☐ Other

67. Where are you and your parents born?

	You	Dad	Mom
The urban area of Weifang	☐	☐	☐
Other areas of Weifang	☐	☐	☐
Other cities in Shandong	☐	☐	☐
Outside of Shandong	☐	☐	☐

68. What is your *mother's* main occupation? *(Tick the alternative that applies)*

- ☐ Working
- ☐ Student/on sick leave
- ☐ Unemployed
- ☐ Other
- ☐ I don't know

69. What is your father's main occupation? *(Tick the alternative that applies)*

- ☐ Working
- ☐ Student/on sick leave
- ☐ Unemployed
- ☐ Other
- ☐ I don't know

70. Imaging society as a ladder. If you think about <u>your families finance's</u> in comparison with the wider community, where would you place your family on the scale below?

At the bottom situation						**At the top situation**
☐	☐	☐	☐	☐	☐	☐

71. How important are the things below in your family? *(Tick one alternative on each row)*

	Very important	Fairly important	Not very important	Not important at all
To tell where you are going	☐	☐	☐	☐
To take care of school work	☐	☐	☐	☐
When to come home in the evening	☐	☐	☐	☐
When to go to bed	☐	☐	☐	☐
To help out with housework	☐	☐	☐	☐
To not skip school	☐	☐	☐	☐
How you behave towards other people	☐	☐	☐	☐

72. Rate the following statements. How well do they apply to your family?

(Tick one alternative on each row)	Applies totally	Rather good	Neither good nor bad	Rather bad	Doesn't apply at all
I can talk to my parents about everything	☐	☐	☐	☐	☐
I like being with my parents	☐	☐	☐	☐	☐
I can always trust my parents	☐	☐	☐	☐	☐
My parents give me many opportunities to do fun things with them	☐	☐	☐	☐	☐

73. Has it ever happened that any of your parents have shoved, hot or used violence against you or any of your siblings? *(Tick one or more alternatives)*

☐ No ☐ Yes, against me ☐ Yes, against siblings

74. Have there been difficult and traumatic quarrels between your parents?

(Tick the alternatives that best applies to you)

- ☐ No
- ☐ Yes, less than once a year
- ☐ Yes, some times each year
- ☐ Yes, some times each month
- ☐ Yes, some times each week
- ☐ Yes, every day or almost every day

75. Has it ever happened that any of your parents have shoved, hit or used violence against the other parent? *(Tick the alternatives that best applies to you)*

- ☐ No
- ☐ Yes, less than once a year
- ☐ Yes, some times each year
- ☐ Yes, some times each month
- ☐ Yes, some times each week
- ☐ Yes, every or almost every day

Here are some questions about your health in general

76. How do you feel?

Very good	Good	Neither good nor bad	Bad	Very bad
☐	☐	☐	☐	☐

77. How tall are you? (Write **whole** centimeters)

☐☐☐ centimeters

78. What is your weight? (Write **whole** kilograms)

☐☐☐ kilograms

Questions about diseases, symptoms and medications

79. If you have any of the following diseases/conditions or symptoms, tick the alternative or alternatives that best apply to you? (*Tick one alternative on each row that apply to your disease/condition)*

	Yes, mildly	Yes, severely
Asthma	☐	☐
Food allergy	☐	☐
Other allergy (for example nickel allergy)	☐	☐
Tinnitus	☐	☐
Diabetes	☐	☐
Depression	☐	☐
Skin disease (for example psoriasis)	☐	☐
Enteritis (for example ulcerative colitis)	☐	☐
Migraine	☐	☐
Anxiety	☐	☐
Other	☐	☐

80.Do you daily take any prescriptive medicine against a certain disease or symptoms?

☐ No ☐ Yes, once ☐ Yes, at least twice ☐ I don't know

81.If you have any of the following disabilities, tick the alternatives which best apply to you. If you don't have any disabilities, proceed to question 82.

Do you have?	Yes, mildly	Yes, severely
Hearing impairment	☐	☐
Visual impairment where glasses or contact lenses does not help	☐	☐
Disabled (in mobility)	☐	☐
Reading or writing difficulties, dyslexia, dyscalculia	☐	☐
ADHD, ADD, Asperger's, Tourette's, etc.	☐	☐

82. Have you during the last school year hurt yourself, been a victim of an accident and had to go to a health center, a dentist or a hospital?

☐ No ☐ Yes, once ☐ Yes, at least twice

83. How often did you have the symptoms below <u>during the latest three months</u>? *(Tick one alternative on each row)*

	Never	Seldom	Sometimes	Often	Always
Headache	☐	☐	☐	☐	☐
Stomach ache	☐	☐	☐	☐	☐
Pain in neck/shoulders	☐	☐	☐	☐	☐
Pain in back/hips	☐	☐	☐	☐	☐
Pain in hands/knees/legs/feet	☐	☐	☐	☐	☐
Nervous	☐	☐	☐	☐	☐
Irritable	☐	☐	☐	☐	☐
Overstrained	☐	☐	☐	☐	☐
Difficulty sleeping	☐	☐	☐	☐	☐

Here are some additional questions about how you are and how you feel. Some of these questions are similar to previous questions, but it is important that you respond to all – they are repeated for a reason.

84. I feel tense and nervous:

Most of the time ☐ Often ☐ Now and then ☐ Not at all ☐

85. I appreciate the things that I enjoyed before:

Definitely as much ☐ Not as much ☐ Only partly ☐ Nearly not at all ☐

86. I have a feeling that something terrible will happen:

Very clear and unpleasant ☐ Not so clearly now ☐ Considerably weaker now ☐ Not at all ☐

87. I can laugh and see the funny side of things:

As frequently as previously ☐ Not as frequently now ☐ Considerably less frequent now ☐ Never ☐

88. I worry about things:

Mostly ☐ Fairly frequently ☐ Now and then ☐ Occasionally ☐

89. I am in a good mood:

Never	Seldom	Sometimes	Mostly
☐	☐	☐	☐

90. I can sit still and feel relaxed:

Absolutely	Usually	Seldom	Never
☐	☐	☐	☐

91. Everything feels sluggish:

Nearly always	Frequently	Sometimes	Never
☐	☐	☐	☐

92. I feel uneasy as if I have butterflies in my stomach:

Never	Sometimes	Fairly frequently	Very frequently
☐	☐	☐	☐

93. I have lost interest in my appearance:

Totally	To a large extent	Partly	Not at all
☐	☐	☐	☐

94. I feel restless:

Very frequently	Fairly frequently	Seldom	Not at all
☐	☐	☐	☐

95. I look forward to things with enjoyment:

As much as previously	Less than previously	Much less than previously	Hardly at all
☐	☐	☐	☐

96. I get sudden feelings of panic:

Very frequently	Fairly frequently	Seldom	Never
☐	☐	☐	☐

97. I can appreciate a good book, a television or a radio program:

Very frequently	Fairly frequently	Seldom	Never
☐	☐	☐	☐

98. During the latest month, how often did you:

	Never	Nearly never	Sometimes	Fairly often	Very often
Felt that you cannot control the important things in your life?	☐	☐	☐	☐	☐
Trusted yourself to handle your personal problems?	☐	☐	☐	☐	☐
Felt that things have gone your way?	☐	☐	☐	☐	☐
Felt difficulties piling up so much that you cannot handle them?	☐	☐	☐	☐	☐

99. Have you during the latest 12 months tried to cut yourself or hurt yourself in any other way?

☐ No ☐ Yes, once ☐ Yes, twice to 5 times ☐ Yes, more than 5 times

Here are some questions about your drinking habits

We are grateful if you answer the questions as accurately and honestly as possible by selecting the option that applies to you. ”Alcoholic beverages” are defined as beer, alcohol strong cider, alcopop, wine, fortified wine and spirits.

A ”glass” is defined as:

50 cl (one can) beer or cider	33 cl (small bottle/can) alcohol strong beer/ cider/alcopop	1 glass red or white wine	1 small glass of fortified wine, e.g. Campari, Martini	4 cl of spirits e.g. vodka, rom, whiskey
				

One ”large” alcohol strong beer or cider = 1½ glass

100. How often during the last 12 months have you been drinking alcohol?	Never	Every other month or more rarely	About once a month	Twice to 4 times a month	Twice to three times a week	4 times a week or more
	☐	☐	☐	☐	☐	☐

101. How often during the last 12 months did you drink so much that you felt drunk?	Never	Every other month or more rarely	About once a month	Twice to 4 Times a month	Twice to 3 times a week	4 times a week or more
	☐	☐	☐	☐	☐	☐

102. How many ”glasses” do you drink on a typical occasion when you drink alcohol? See example above)

I don’t drink alcohol	1-2 ”glasses”	3-4 ”glasses”	5-6 ”glasses”	7-9 ”glasses”	10 or more ”glasses”
☐	☐	☐	☐	☐	☐

103. How frequently do you drink 6 ”glasses” or more at the same occasion?

Never	Every other month or more rarely	About once a month	Twice to 4 Times a month	Twice to 3 times a week	4 times a week or more
☐	☐	☐	☐	☐	☐

Love, sex and relationships

104. Are you in a relationship right now?

Yes, boyfriend ☐ Yes, girlfriend ☐ No ☐ → **Proceed to question 106**

105. How are things between you and your partner? (Don’t tick more than two alternatives)

Loving/secure	Fun	Dull/boring	Insecure/threatening
☐	☐	☐	☐

106. Which of these terms do you think best describes you? *(Tick one or more alternatives)*

Hetero-sexual	Bi sexual	Homo-sexual	Trans-gender	Queer	Uncertain
☐	☐	☐	☐	☐	☐

107. Have you had intercourse?

Yes ☐ No ☐ → **Proceed to question 110**

108. Did you use contraceptives last time you had an intercourse? *(Tick one or more alternatives)*

No	Yes, the pill	Yes, condom	Yes, other contraceptive
☐	☐	☐	☐

109. With how many people have you had intercourse?

One	2-4	5-10	11 or more
☐	☐	☐	☐

Here are some questions about tobacco and drugs

110. Do you smoke?

No, I have never smoked	No, I have stopped smoking	Yes, I smoke now and then	Yes, I smoke daily
☐	☐	☐	☐

111. Do you use snuff?

No, I have never used snuff	No, I have stopped using snuff	Yes, I use snuff now and then	Yes, I use snuff daily
☐	☐	☐	☐

	Never	Once	2-4 times	5-10 times	11-20 times	21-50 times	More than 50 times
112. Have you ever smoked hookah (water pipe)?	☐	☐	☐	☐	☐	☐	☐
113. Have you ever sniffed glue, solvent or any other substance?	☐	☐	☐	☐	☐	☐	☐
114. Have you ever used drugs classified as narcotics which were not prescribed for you?	☐	☐	☐	☐	☐	☐	☐
115. Have you ever used testosterone, anabolic steroids or any other growth hormone (not prescribed by a doctor)?	☐	☐	☐	☐	☐	☐	☐
116. Have you ever used hashish/marijuana?	☐	☐	☐	☐	☐	☐	☐
117. Have you ever used any other drug than hashish/marijuana, for example spice?	☐	☐	☐	☐	☐	☐	☐

Some questions about food and exercise

118. How often do you have the following meals during one week?

	Every day	4 to 6 days	1 to 3 days	Seldom/never
Breakfast	☐	☐	☐	☐
Cooked lunch	☐	☐	☐	☐
Cooked food in the evening	☐	☐	☐	☐

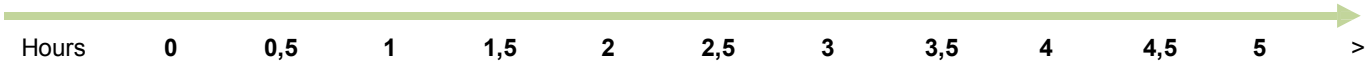
	4-5 days	1-3 days	More rarely/ never
119. How many days each week do you have lunch in school?	☐	☐	☐

	More than once per day	Almost daily	A few times a week	Once a week	More rarely or never
120. How frequently do you eat fruit and/or vegetables?	☐	☐	☐	☐	☐
121. How frequently do you eat sweets? (not chewing gum)	☐	☐	☐	☐	☐
122. How often do you drink soda?	☐	☐	☐	☐	☐

	Every day	4-6 times a week	2-3 times a week	Once a week	1-3 times a month	Less than once a month	Never
123. How often do, in total, you walk or cycle more than one hour per day?	☐	☐	☐	☐	☐	☐	☐
124. In your leisure time, how often do you work out more than 30 minutes, so that you get breathless and sweaty?	☐	☐	☐	☐	☐	☐	☐

Questions about your computer, television and cellphone habits

125. How many hour per day on average do you use computers during leisure time (not at school)?
Mark with a circle on the timeline to show the number of hours



Hours	0	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	> 5

126. How many hours per day on average do you use computers at school?
Mark with a circle on the timeline to show the number of hours

Hours	0	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	> 5

127. How many hours per day on average do you watch common television programs?
Mark with a circle on the timeline to show the number of hours

Hours	0	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	> 5

128. How frequently have you played games/surfed/chatted on the Internet continuously more than 10 hours?

Never, almost never	Some times a year	Some times a month	2 to 4 times a month	Several times a week
☐	☐	☐	☐	☐

129. Do you use a laptop at home or at school?

Yes	No
☐	☐

If No, proceed to question 131

130. If you use a laptop, without an external keyboard and screen, how long on average per day do you use it?

Less than 5 minutes daily	About 5-30 minutes daily	About 30-60 minutes daily	About 1-2 hours daily	About 2-3 hours daily	More than 3 hours daily
☐	☐	☐	☐	☐	☐

131. Do you have a cellphone?

Yes	No
☐	☐

If No, proceed to question 136

132. How old were you when you got your first cellphone?

☐☐ years 

133. On average, how long do you talk on the cellphone each day?

Max 5 min/day	About 5-15 min/day	About 15-30 min/day	About 30-60 min/day	More than 60 min/day
☐	☐	☐	☐	☐

134. Do you use hands free device when talking on the cellphone?

Yes	No
☐	☐

135. Have you been awakened by your cellphone at night during the last two weeks?

My cellphone is switched off at night	No	Yes, once	Yes, several times
☐	☐	☐	☐

136. Do you have a cordless phone as home phone (a so called DECT-phone, not a cellphone)?

Yes	No
☐	☐

If No, proceed to question 138

137. How long do you on average talk on the cordless phone at home each day?

Max 5 min/day	About 5-15 min/day	About 15-30 min/day	About 30-60 min/day	More than 60 min/day
☐	☐	☐	☐	☐

Some questions about school

138. How do you get on in school?

Very well	Fairly well	Neither well nor bad	Fairly bad	Very bad
☐	☐	☐	☐	☐

139. If you consider your social status or position at school among your schoolmates, where would you place yourself on the scale below?

The lowest status/position ☐ ☐ ☐ ☐ ☐ ☐ ☐ The highest status/ position

140. Do you skip school?

No, never	Yes, occasionally during the semeste	Yes, once a month	Yes, 2-3 times a month	Yes, once a week	Yes, several times a week
☐	☐	☐	☐	☐	☐

141. Have you got the grade Fail in any school subject?

No, not in any subject	Yes, in 1-2 subjects	Yes, in 3-4 subjects	Yes, in 5 or more subject
☐	☐	☐	☐

142. Do you have special teaching or tutoring to support your school work?

No	Yes, in a single subject	Yes, for all school work
☐	☐	☐

143. Have you during the last school year felt uneasy at the prospect of going to school because of fear of getting into trouble during the school day??

No/never	Yes, once	Yes, several times
☐	☐	☐

144. Have you during the last school year been beaten, kicked or subjected to other forms of violence from your schoolmates?

No/never	Yes, occasionally	Yes, 1-3 times each month	Yes, at least once a week
☐	☐	☐	☐

145. Have you been teased seriously, for example been accused for things you didn't do, been threatened, or been called ugly things by your schoolmates during the last school year?

No/never	Yes, occasionally	Yes, 1-3 times each month	Yes, at least once a week
☐	☐	☐	☐

146. Have someone or a group of your schoolmates lied about you, talked about you behind your back, ignored you or frozen you out during the last school year?

No/never	Yes, occasionally	Yes, 1-3 times each month	Yes, at least once a week
☐	☐	☐	☐

147. Have you during the last school year been bullied, threatened or harassed by cellphone and/or Internet (SNS, Facebook, e-mail etc.)?

No/never	Yes occasionally	Yes, 1-3 times each month	Yes, at least once a week
☐	☐	☐	☐

148. Have you been severely insulted or mistreated by any adult at school during the latest school year?

No/never	Yes, once	Yes, several times
☐	☐	☐

149. How well do these statements apply to you?	Agree completely	Agree partly	Neither agree nor disagree	Disagree partly	Disagree completely
I have a strong desire to learn	☐	☐	☐	☐	☐
I think that knowledge is important	☐	☐	☐	☐	☐
I am happy to discuss matters in class	☐	☐	☐	☐	☐
If I have problems in school, my parents are prepared to help me	☐	☐	☐	☐	☐
It is ”hip” to be stressed about schoolwork	☐	☐	☐	☐	☐
I dare to ask questions to the teachers in class	☐	☐	☐	☐	☐
My school performance is important for how I will succeed in the future	☐	☐	☐	☐	☐
My parents encourage me to perform well in school	☐	☐	☐	☐	☐
If schoolwork is to challenging for me, my parents will help me	☐	☐	☐	☐	☐
Pupils and teachers treat each other respectfully at school	☐	☐	☐	☐	☐

150. To what extent do you think that the statements below apply to your teachers?

	Apply to nearly all teachers	Apply to more than half of the teachers	Apply to half of the teachers	Apply to less than half of the teachers	Does not nearly apply to any teacher
They are good at getting us to think independently	☐	☐	☐	☐	☐
They are good at planning teaching so that exams don't clash.	☐	☐	☐	☐	☐
They make an effort so that no pupil shall be frozen out or bullied.	☐	☐	☐	☐	☐
They give useful feedback on my schoolwork	☐	☐	☐	☐	☐

151. How well do this apply?

	Agree completely	Agree partly	Agree somewhat	Disagree partly	Disagree completely
The classrooms are quiet and peaceful, so that you can work	☐	☐	☐	☐	☐
There is a lot of space in the classroom	☐	☐	☐	☐	☐
Toilets and showers at school are clean and fresh	☐	☐	☐	☐	☐
Classrooms are clean and comfortable	☐	☐	☐	☐	☐

152. Are you a member of any sports club? ☐ Yes ☐ No

If Yes, what sports? ***Tick all that apply.***

☐ Football ☐ Basketball ☐ Gymnastics ☐ Badminton

☐ Athletics ☐ Table tennis ☐ Dance ☐ Martial arts

☐ Other sports club… Please specify: _____

153. Are you a member of any other club (e.g. music or painting)? ☐ Yes ☐ No

154. Think about society as a whole and tick that alternative which applies best to how you feel.

	Agree completely	Agree partly	Disagree partly	Disagree completely
You can trust most people	☐	☐	☐	☐
One can never be too careful when meeting strangers	☐	☐	☐	☐
Most people try to be helpful	☐	☐	☐	☐
Most people would use others if they had the opportunity	☐	☐	☐	☐
Most people care only about themselves	☐	☐	☐	☐
Most people are honest	☐	☐	☐	☐

155. How do you see your own future?

☐	☐	☐	☐	☐
I see a very bright future	I see a fairly bright future	I see a neither bright nor dark future	I see a fairly dark future	I see a very dark future

156. Have you ever received sex education at school?

□ Yes □ No

157. Have you ever received education by school mental health advisors?

□ Yes □ No

158. How do you think school mental health advisors are useful for you?

□Very useful □Partly useful □Somewhat useful □Not very useful
□Hardly useful

159. Who will you seek help from when you feel that you may have mental problems? *Tick all that apply.*

□Teacher (not including school mental health advisor) □Mental health advisor

□Psychologist □Parents □Sibling(s)

□Other adults in the family □Peers □Boyfriend or girlfriend

□Others, please specify: ----------

160. What kind of education and counseling would you like to have? *Tick all that apply.*

□Regular lectures/workshops regarding mental health in response to your question

□Face-to-face psychological counseling when requires

□Psychological counseling via hot-lines when requires

□ Psychological counseling via the Internet when requires

□ Others, please specify:----------

161. What comment and advice do you have for this survey?

Now you are finished! ☺ Many THANKS for your participation in the survey!